

NOTICE OF THE MAMMALS AND BIRDS INHABITING KACHH,—  
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The study of local faunas must, for some time at least, continue one of the most important means of leading to a full understanding of Indian Zoology. India combines such an enormous variety of physical conditions, namely, differences in level, climate and vegetation, all of which have to be studied in connection with the animal life, that one is almost lost in the chaos of information required, and is very apt to overlook conditions, which may be essential for the explanation not only of peculiarities as regards distinctions of species, but also of those relating to geographical distribution.

Researches limited to single districts are not necessarily liable to these disadvantages, because they can more easily command the smaller amount of observations, and obtain an acquaintance with the physical conditions which may lead to their explanation.

It is with this view that I have ventured to place on record what little I observed of the Zoology of Kachh. I scarcely need to add that I greatly regret the incompleteness of the lists, but as the duties of the geologist are entirely different from those of a zoologist, he can hardly pretend to give satisfaction to both. During my rather hurried visit, my attention was chiefly directed towards the Vertebrata,\* and in this branch I attempted to

\* Invertebrata are also by comparatively small numbers represented, as may be indicated by the following notice :

Of Crustacea I have obtained only two species in the streams, a small *Palæmon* which is tolerably common, and a *Chirocephalus* (= *Branchipus*, apud Milne-Edwards); the latter only occurred in a slightly brackish stream west of Bhuj. Mr Wood-Mason who examined the two species tells me that the latter presents a remarkable modification of the antennæ.—The Arachnoids, which were specially looked after, did not yield more than twenty species, chiefly of the families *Epeiridæ* and *Lycosidæ*, and a few *Salticidæ*. Of *Scorpions* I got four species; *Scolopendræ* three; *Juli* two or three. The *Coleoptera* commonly seen mostly belong to the *Blapsidæ*, which form an important article of food to the hedgehog; *Scarabæidæ* and *Carabidæ* are comparatively few, and still rarer other kind of beetles. Butterflies, on account of the almost constant strong winds, are very rarely seen, indeed with the exception of a few small *Pieridæ* and *Lycænidæ*, and a number of Microlepidoptera, I have scarcely seen any other species. The *Hymenoptera* are mostly represented by *Ichneumonidæ*. Ants are a real pest in houses and in the camp, in spite of the dryness of the climate. Of *Rhynchota* my collection barely contains a dozen species, including the *Nepæ* and *Cicadæ*, but they must be more numerous during the wet season. Of *Libellulidæ* I obtained about ten species, and not many more are, I think, procurable in winter. *Blattidæ* I have seen three, the most common is *Periplaneta germanica*. Of *Acrididæ* &c., about a dozen or more species occurred.

note down and to collect what was possible, without interfering with my other more important work. The list of the mammals and birds will be given in the following pages; on the reptiles and amphibians I have already reported, (see Proc. A. S. B., for May, 1872, p. 71); and the examination of the fishes was kindly undertaken by Surgeon Major Day, whose paper on the subject follows the present one.

However, before entering upon any details, it will be probably desirable to say a few words regarding the principal physical features of the country, particularly in connection with the mammals and birds to be met with; only adding here that my remarks solely apply to the aspect of the country during the cold and dry season between November and February.

The province of Kachh extends for about 150 miles along the Tropic of Cancer, having a breadth of about 40 miles on either side of it, and the Meridian of 70° eastern longitude passes through it a little eastward of the centre. The main land stretches along the seacoast from the most eastern branch of the Indus to Káthivár, from which it is separated by the Gulf of Kachh; to the North and East it is entirely isolated from Sind and the eastern Rajpútána states by the so-called Ran, which was no doubt formerly an arm of the sea, but is now very much silted in. It has a varied breadth from 40 to nearly 100 miles. During the dry and hot weather some portions of it are under water and others are so thickly covered with a saline deposit, or almost pure salt, that the ground becomes unfit for the support of animal life. A wild ass may be seen in the distance, or a desert-lark (*Certhilauda desertorum*) running along the trodden track, but scarcely any other animal exists, unless a bird may accidentally migrate from one place to another. During the rainy season by far the greatest portion of the Ran is inundated, and a good number of the larger water birds are said to be seen on it. The slightly elevated ground, which locally forms strips in the Ran proper, supports a very scanty vegetation of rough grasses (*Cyperaceæ*), and of a few scattered bushes of tamarisk &c.; this part is called the Buni and, if the monsoons are not heavy, it affords rich pasture for cattle during that time, but in the dry season even the nomadic Sindees are often obliged to

Of freshwater sholls which, however, also occur in slightly brackish streams, I met with the following: *Planorbis exustus*; *Plan. n. sp.*, allied to *Cantoris*; *Lymnæa luteola* and *amygdalus*, the latter closely allied to *acuminata*; *Paludina dissimilis*, (*melanastoma*) exactly identical with South Indian and Ceylon specimens; *Bythinia pulchella* and two other species of the same genus; *Melania tuberculata*; *Unio cæruleus* and *leiona*; and a small *Corbicula*, apparently very rare.

Of landshells I found *Bulimus insularis*, *B. abyssinicus*, *B. punctatus*, *B. cænopictus* and two other *Bulimi*, allied to the last, one slightly and the other very much, thinner, almost cylindrical; *Ennea bicolor* (cylindrical and perfectly smooth variety); *Stenogyra gracilis*; *Helix fallaciosa* and *Tranquebarica*, *Macrochlamys pedinus*, *Succinea vitrea* and *crassiuscula*. With the exception of *Bul. insularis* none of the shells is common.

leave it for want of water. Wherever intercalations of clayey beds between sandy layers make a slight accumulation of fresh water possible, Kunda-treelets (*Prosopis*) grow rather abundantly and form little forests, sometimes of one or two miles in length, but generally very narrow in breadth. However, little life animates these isolated tracts.

Among the Kunda *Sylvia curruca*, *Phylloscopus tristis*, *Lanius lahtora* and *vittatus*, *Saxicola desertorum* (= *atrogularis*), *Turtur Cambayensis*, *Upupa Ceylonensis*, *Athene brama* and perhaps a few of the smaller hawks, and the ubiquitous *Sciurus palmarum* are almost all the birds and mammals to be observed, in addition to the usual camp followers, kites, crows, pigeons, &c. The herds of cattle and sheep are invariably accompanied by *Dicrurus albirictus*, and wolves, hyænae, and generally also a leopard are not far off. On the woodless portions of the Buni, almost the only birds to be seen are *Spizalauda deva*, *Alauda triborhyncha*, *Pterocles exustus*, *Cursorius Jamesoni* (= ? *gallicus*), *Chettusia gregaria*, and one or two others of the cursorial tribe.

The little islands in the Ran, called Beyts, are nearly quite uninhabited, and on the slightly larger ones a harrier and a stonechat (*Circus Swainsoni* and *Saxicola picata*), or perhaps locally a stray dove, the pursuer and the pursued are all that an ordinary observer would notice of animal life.

The more elevated ground can be physically divided into three, (or perhaps four) nearly parallel ranges, extending almost due east and west. Each of these ranges has an abrupt declivity on the northern and a very gradual slope on the southern side. Thus the greatest elevation in each range lies near the northern edge, where precipitous cliffs and moderately hilly tracts occur; but as the greatest height of any of the hills in Kachh does not exceed 1500 feet, and as the entire breadth of the hilly portions is rarely more than three or four miles, they are not capable of producing any essential effect upon, or change in, the general climatal conditions. The hills are as a rule only thinly covered with brushwood, mostly consisting of leafless and thorny bushes, and oftener they are almost entirely bare.

The first of the ranges occupies Pacham, Karir, Bela and a few adjoining small islands in the Ran; their northern declivities are for want of water entirely uninhabited, but each has a long and gradual, though very thinly populated, slope to the south. On the eastern and western sides, the ridge rather abruptly disappears under the Ran, to the south the slope gradually passes into the Buni, and Bela is scarcely separated from Wagur, which is the most eastern district, moderately but very irregularly hilly, composed of short ranges and a few isolated basalt hills; and towards the west connected by low, mostly cultivated, ground with Kachh proper. The second (the Jora-Hulaman) range stretches along the northern edge, and the third, the Charvar

and Katrol range, nearly through the centre of the mainland of Kachh. These two ranges more gradually decrease in height towards their ends and join each other near the western extremities, but diverge on the eastern side, the former passing in its prolongation through Wagur. The fourth range is the lowest, lying south only a short distance from the Charvár-Katrol range, and is sometimes not very distinctly separated from it; it entirely consists of basaltic trap and is locally rather thickly covered with bushes and Kunda.

As the configuration of the ground very much depends upon its lithological structure, I may notice that sandy or shaly limestones only occur in the axes of the first and second ranges, but far more prevalent are sandstones and shales. Solid basalt and quartzitic rocks occur in isolated hills, or in dykes, and there are also a few shorter and longer ridges consisting of varied trap-rocks which easily break up in fragments and, if any moisture exists, readily decompose. Decomposition goes on, however, at a much more rapid pace in the softer rocks, namely, the sandy limestones, sandstones and shales. It is indeed often not easy to meet for days with a rock, that would not crumble almost under the fingers, unless it be accidentally hardened, by a neighbouring basalt dyke, or some other causes producing dislocations of strata, &c.

On account of this rapidity with which the disintegration of the rocks has been going on from time immemorial, all the depressions between the hills, the ravines and river courses, had been deeply filled up with sand, which with equal facility also spread into the longitudinal valleys separating the principal ranges. Thus instead of fertile valleys, we meet with extensive sandy plains, which are capable of supporting only a very scanty vegetation, and the monotony of which is merely interrupted by an isolated basalt hill, or a trap or quartz dyke of a few miles in length. There exists some geological evidence which indicates, that at least along the northern precipitous slopes of the ranges locally a very large accumulation of water had taken place in comparatively recent geological time, and then moisture, vegetation and animal life might no doubt have in equal proportion been greater and more prosperous. It was probably also at that somewhat remote time, when the great and deep ravines had locally been cut, the existence of which, with the present comparatively insignificant water supply, it is almost impossible to explain. But now the fine water sheets have given way to desert ground, on which the sand is shifted about at the will of the agitated atmosphere.

The prevailing, and usually heavy, winds within the greater part of the year, appear to come from South-West or West, although during the cold season North-east winds are by no means uncommon. But instead of bringing any moisture from the sea side, they seem to take away the little which exists. The ground is so dreadfully heated under the powerful glare of a rarely covered sky, that it seems entirely to prevent even the approach of

moisture, unless the atmosphere be near the point of saturation; and this seems indeed to be of very rare occurrence.

Mr. Wynne, in whose Memoir on the Geology of Kachh\* the physical geography of the province is briefly referred to, states that the average rainfall for the last twenty-one years up to 1869 was only 14·3 inches; within the three past years the annual fall scarcely exceeded ten inches. Some tracts of the country had actually barely a drop of rain during the whole year, and these had to be deserted during the dry season by the inhabitants, who generally on such occasions betake themselves with their cattle to Sind, returning to their homes during the following rainy season.

This state of affairs is not in any way mitigated by a marked change in the general temperature of the air. Ice is apparently quite unknown in Kachh. On very cold mornings in December and January, I occasionally saw the thermometer as low as 35°, but it never sank to freezing point, and that comparatively low temperature was observed only along the Ran, where the wind blowing across the wet Ran was cooled down. Even in those two months the thermometer was rarely under 80° or 90° after midday in the shade, and in February, it generally rose to about 100°. In the sun I have not seen it a single day under 100 degrees.

In consequence of this scarcity of rain, on account of the great heat, and further on account of the abundance of superficial sandy deposits, large rivers are entirely unknown, at least during the greater part of the year. The little water, which is supplied by a few springs in the hills, is generally lost in the sand before it reaches the desert plain, or it accumulates into small pools and hollows in suitable places, where clayey beds retard or stop the percolation through the sand. But in slowly passing through the sand, the water becomes more or less saturated with various salts, the consequence being that, if any running water at all is to be met with in a stream, it is in nine cases out of ten brackish,—not wholesome for beasts and deadly for men. But even in the wells, which the people sink for purposes of raising water for irrigation, this is often brackish, and it is sometimes with the greatest difficulty that perfectly fresh water can at all be obtained near a village. The simple recollection of the foul and dirty fluid, that one is occasionally obliged to accept in order to quench his thirst, is enough to make one shudder.

All these elements of physical condition, to which I have briefly referred, tend towards making the country a *terra hospitibus ferox*, an expression often repeated for want of a more suitable one, or, as an early traveller expressed himself, a country fit only for a geologist to travel in. The general result of those unfavourable physical conditions is, that we have before us a few ranges of low hills of 80 or 100 miles in length, varying in height from

\* Mem. Geol. Survey of India, vol. IX, p. 12 et seq.

about 300 to 1400 feet, either bare, or covered with scanty grass or low thorny bushes, and intersected by dry ravines filled with debris and sand. Except along their edges these hilly tracts are scarcely at all inhabited. The depressions separating the longitudinal ranges more resemble in the average time of the year a desert than a habitable country. The ground is mostly very sandy, and although naturally not unproductive, it is sterile for want of moisture. Enormous bushes of *Euphorbia nerifolia* take the place of what elsewhere might be a forest, or at least a thick jungle. A few fig-trees near the villages is all that may deserve the name of a tree, and even these are by no means plentiful. During a tolerably good rainy season, the fields generally yield a crop of either barley or wheat, or other seasonal fruits; during the cold weather, however, scarcely anything but a very inferior crop of cotton can be earned; and this only locally. A fair crop is, however, generally possible, wherever the people are able to obtain a sufficient quantity of water from the wells for irrigation. In this they often succeed best in those localities which lie along, or not far from, a fault in the rocks, because this usually stops the escape of water. Whatever mischief the numerous trap-dykes and basaltic eruptions might have produced at no very distant geological period, it is very fortunate for the country, that they are so numerous; for I would scarcely hesitate to say that without them by far the greater part of Kachh would long ago have become a perfect desert. Each village has, it is true, its small tank, but unless the retention of water is facilitated by some natural cause, it is sure to have dried out about the middle of the cold season. Wherever a tank with good deep water exists by the end of February, it is almost certain to have been washed out in a hollow of clayey beds, or it rests towards a fault of the rocks, or a quartzite or trap-dyke. In some cases men might have taken advantage of the natural situation, and assisted the reservoir by an embankment, but as a rule, the Kachh people seem to be rather indifferent to this necessity of human and animal comfort, and in this special case, one might justly say, the necessity of life.

Out of the great number of tanks, which are, strictly speaking, the only water reservoirs, five or six average a mile, or a little more, in length, and might deserve the name of small lakes. In other parts of India they would probably be little thought of, but in a dry country, such as Kachh is, they are of no small importance. In the monsoon time they are of course of greater extent, but even at the greatest height of the water supply, the low situation of these reservoirs, sometimes in deep hollows, precludes the use of the water for purposes of irrigation; they are, however, during the cold season the only places to which a large number of waterfowl of all kinds resort.

Having thus become acquainted with an outline of the physical features of Kachh, we may better be able to understand the association of the mam-

mals and birds which I shall enumerate in the following pages. Of course judging from both the uniformity, as well as the scarcity, of favourable natural conditions, one could *a priori* only expect a very poor fauna and flora. The vegetation of the country in general, setting aside that of the cultivated tracts, may indeed be regarded as a picture of sterility. Very few flowering plants are to be seen in the dry season. Among the herbaceous plants\* those growing on sandy or saline ground naturally prevail over others, and their leaves are often leathery and thick, or sometimes reduced to spines and thorns. Among saline plants the most common are *Statice Stocksii*, *Solanum trilobatum*, and a *Pluchea*. Of other more common species of herbaceous plants I may notice: *Trichodesma indicum*, *Heliotropium supinum* and *strigosum*, *Solanum nigrum*, *Crotalaria Burhia*, *Orygia decumbens*, *Phalangium graminifolium*, *Vahlia viscosa*, *Salvia ægyptiaca*, *Convolvulus pluricaulis*, *Cressa Cretica*, *Polygala Vahlia*, *Glinus mollugo*, *Polygonum plebejum*, *Euphorbia thymifolia* and *E. dracunculoides*, *Evolvulus alsinoides*, *Aristida depressa*, *Ærva Javanica*, *Vernonia cinerea*, *Trianthemum crystallinum* and *T. decandrum*, and others. Mr. Kurz determined about one hundred species out of a small collection I made; a few appear to be new. The low jungles barely deserve this name, for they are almost entirely composed of thorny bushes (*Capparis aphylla*) with little or scarcely any foliage. Among others I may mention *Tamarix orientalis*, *Celastrus senegalensis*, two species of *Grewia*, and *Cratava Roxburghii*, the last growing into a tree, also Kunda (*Prosopis spicijera*,) is locally numerous, but scarcely more generally distributed than the *Cactus* like *Euphorbia neriifolia*, which often for miles suppresses all other semi-arboreal vegetation. The only fine trees to be occasionally seen are *Ficus religiosa* and *F. Bengalensis*, in the neighbourhood of villages or near wells, where they are planted as a shelter against the heat of the day.

Extensive forests are, as already observed, unknown, and, naturally, we would look in vain for any of the large Carnivora, (except as mere stragglers), and the existence of large Pachyderms or Ruminants is made entirely impossible. Equally so we almost entirely miss the true forest denizens of the feathered tribe, such as the *Bucerotidæ*, *Picidæ*, *Certhiidæ*, *Sittidæ*, *Phasianidæ*; a few of the Eastern type of birds like the *Eurylaimidæ* or *Treronidæ* are also entirely absent, their geographical distribution† being rather limited. But other families, which might be expected to

\* I am indebted to Mr. S. Kurz for the names of the plants.

† Too much importance is, I think, occasionally attributed to the so-called laws of geographical distribution, independently of other agencies, as if these laws were innate to the animal. When speaking of the geographical distribution of a species, one is apt to forget, that these geographical limits are *mainly* dependent upon the physical conditions, required for, and suitable to, the existence of a certain species.

occur, likewise shew very few representants, such as the *Muscicapidæ*, *Ampeplidæ*, *Fringillidæ*, *Corvidæ*, &c.

Among the brushwoods the common birds are *Pygenonotus chrysorrhoides*, *Otocampsa leucotis*, *Lanius vittatus*, *Iora Zeylanica*, *Sylvia curruca*, *Munia Malabarica*, &c., less numerous are *Phyllopnucste rama*, *Pericrocotus peregrinus*, *Orthodomus longicaudus*, *Drymoipus Jerdoni*, *Phylloscopus tristis*, *Tephrodornis Pondiceriana* and a few others, while *Parus nuchalis* or *Leucocerca aureola* are great rarities. Hunting between the bushes on the ground, we meet with *Thamnobia Cambayensis*, *Citrinella Huttoni* and *Chatorhca caudata*, always in company with *Franklinia Buchanani*, and on still more open ground *Saxicola picata* and *deserti* (= *atrogularis*). The above are actually the only very common birds, and five of each may at any time be seen for every one of any other kind.

In the sandy plains we meet with a great number of GRALLE, particularly *Otitidæ* and *Charadriidæ*. Among these *Cursorius Jamesoni* (?= *gallicus*), *Chettusia gregaria*, *Lobivanellus indicus*, *Sarciophorus bilobus*, *Grus cinerea*, *Houbara Macquennii*, are characteristic of the country; several of these depart during the summer, but are replaced during the rains by the Florikan, *Syphcotides auritus*, which is said to arrive in large numbers in the rainy season.

The starlings, grey partridges, pigeons, and doves keep, naturally enough, near the villages. In the fields few other larger birds except *Geronticus papillosus* and *Buphus coromandus*, and occasionally *Grus antigone*, are to be seen; of smaller birds *Agrodroma campestris* and several species of larks are common. Both Grallatores and Natatores are abundant on the small lakes and tanks. Indeed scarcely a pool of water, if only thirty or forty feet in length, will be met with without some species of *Actitis* or *Totanus*, but particularly common are *Himantopus intermedius*, *Spatula clypeata* and *Querquedula crecca*. On the somewhat larger tanks one is certain to meet besides these with the gadwall (*Chaulelasmus streperus*), the pintail (*Dafila acuta*), the little grebe (*Podiceps minor*), and also *Limosa agcephala* and one or the other of the white *Herodias*. Naturally in an open country, where sport is comparatively easy, birds of prey would not be wanting, and amongst these *Falco jugger*, *Hypotriorchis chiquera*, *Aquila fulves-*

A change in the physical conditions of a country will be rapidly followed by a corresponding change in the fauna, either decreasing or increasing, and thus the geographical limits of a species become mainly dependent upon physical conditions. To give an example, I mean, that if for instance one of the low hill ranges of Kachh, averaging a height of a few hundred feet, was replaced by one of similar mineralogical character and of an average height of 5000 feet, we would very soon find it wooded, and then inhabited by an abundance of Malabar forms, although these would be absent in the intervening desert country. An actual example of this may be seen on Mount Aboo, as known from Dr. King's list of birds.



*cens* and *Buteo ferox* are to be seen almost everywhere; many others are more local.

Perhaps a better general idea of the character of the vertebrate fauna might be formed, when we inquire what the country is capable of supporting all the year round, and at the same time exclude those animals, the existence of which mainly, or entirely, depends upon the presence of man and his habitations.

Among the mammals we find the Rodents most prevalent,—*Gerbillus erythrourus*, *Sciurus palmarum*, *Lepus ruficaudus*,—the first being by far the most common, and next come the Indian antelope and gazelle; thus all vegetable feeders.

If we exclude from the 160 species of birds, which I obtained, the so-called camp-followers, we find that about half the remainder are migratory, therefore merely winter visitors. And although some of the migratory birds may in a favourable hot season remain in the country, others which are generally considered as permanent settlers often partially migrate to more suitable localities in India. Among these I may mention for instance *Ceryle*, *Pratineola*, *Coracias*, *Ptionoprogne*, *Caprimulgus*, *Citrinella*. Therefore, in an ordinary summer season I certainly do not expect that more than about one hundred species of birds are to be met with in Kachh, really a very small number, when compared with what one is used to observe on a similarly large area in many other parts of India.

Of Reptilia and Amphibia I have observed thirty species; and, although this number is decidedly larger during the rains, not more than half a dozen of them are really of common occurrence. (Comp. Proc. A. S. B., May, 1872, p. 71).

The fresh-water fishes, which I collected, belong, according to Dr. Day, to eighteen species; there is only one Siluroid among them, most of the others belong to the *Cyprinidæ*, and one is a *Cyprinodon*, the first species of the genus known in Indian fresh-waters. However small the number may appear to be, I almost doubt if it could be much increased; for where rivers are almost unknown, and where half of the tanks are liable to disappear for several months during each year, and where besides such a number of skilful fishers\* are eagerly employed during a time when the water is lowest, fish have not much chance to prosper.

\* About forty species of *Grallatores* and *Natatores*.

## MAMMALIA.\*

## Primates.

I have only on a single occasion seen a *Presbytis* which appeared to be in a wild state. It came towards the evening to drink at a tank some distance from the fort Kanmir (in the south-eastern part of the Wagur district), and as its entire face was jet black, I presume, it was more likely *P. priamus* than the Bengal *P. entellus*, but I could not approach sufficiently near to ensure the identification.

Besides that, I saw both *Inuus rhesus* and *Macacus radiatus* in captivity, but they appear to have been imported.

## Chiroptera.

The notes on this order have been kindly communicated to me by G. E. DOBSON, Esq., B. A., M. B.

## Fam. RHINOLOPHIDÆ.

## PHYLLORHINA FULVA, Gray.

Of the specimens of this species obtained, two, a male and female, were taken at the same time and place. The fur of the female specimen is bright golden yellow, that of the male white at the base of the hairs for more than three-fourths their length, the remaining portion to the tip dark purplish brown. The male is larger than the female which is apparently not quite adult.

This proves the identity of *Ph. fulva* with *Ph. murina* and *Ph. cineraceus*, and leads to the belief that *Ph. ater* and *atratus* are also synonyms of the same species. This remarkable variableness of the colour of the fur is not, however, confined to this species, it is met with also in other Rhinolophine bats; in *Ph. larvata*, Horsfld., for example, where the colour of the fur varies from bright orange fulvous, with brownish or ferruginous tips, to bluish black with black tips, a circumstance which has given rise also to much confusion, as the species has received as many names as the different colours of its fur. The same remarks apply to the species of other families of Chiroptera, notably to the PTEROPIDÆ.

Other male and female specimens of this species were also obtained about the same time, the fur of all presents the same colour:—white with dusky tips to the hairs. This shows that the colour of the fur in *Ph. fulva* does not depend on locality, or season. The smaller size of the fulvous female specimen referred to above, taken with its less perfectly developed

\* The systematic names and further observations on the species recorded will be found in Jerdon's 'Mammals of India,' except in a few cases where a special reference, or a description, is added.

teeth, and apparently not quite complete ossification of the extremities of the metacarpal and phalangeal bones, indicates age as a very probable cause of the differences of colour that have been observed. The young of the first and second year most probably present this golden fulvous hue which gradually changes to white, as the animal attains the adult condition.

The following table gives the measurement of the two specimens first referred to; and of another, an adult female, from the same locality, with white fur, tipped with purplish black.

	♂	♀	♀
Length, head and body,.....	1.9	1.75	1.9
"    tail, .....	1.15	1.15	1.1
"    head, .....	0.75	0.7	0.75
"    ear, anteriorly,.....	0.85	0.8	0.85
Breadth, ditto,.....	0.65	0.65	0.65
Length, forearm,.....	1.55	1.55	1.55
"    thumb, .....	0.3	0.3	0.3
"    second finger, .....	2.45	2.4	2.5
"    fourth ditto, .....	2.0	1.9	2.1
"    tibia, .....	0.7	0.7	0.72
"    foot and claws, .....	0.32	0.32	0.32

Generally distributed, but not common.

*Fam.* RHINOPOMATIDÆ.\*

RHINOPOMA HARDWICKII, Gray.

This species is extremely common, usually taking up its abode in wells. All possess large accumulations of fat posterior to the anus, in much greater quantity than usually observed, the mass of fat in many individuals probably much exceeding in weight the remainder of the body.

*Fam.* NOCTILIONIDÆ.

TAPIHOZOUS KACHHENSIS, Dobson, n. sp.

In form, colour of the fur, and size corresponds very closely with *T. saccolaimus*, Geoff., but easily distinguished by the complete absence of the gular pouch in both male and female. A small fold of wing-membrane forms a shallow pouch in the angle between the radius and fifth metacarpal bone, much less developed than in *T. longimanus*, Hardw. Ears as in *T. saccolaimus*, but slightly larger, and the tragus is naked; inner margin bordered with a row of small papules.

\* I have formed this family, provisionally, for the reception of the genus *Rhinopoma* of which the type, *Rh. Hardwickii*, is the sole representative. This genus has been classed by Drs. Gray and Peters with the *Megadermatidæ*, but, on carefully comparing the skeleton of *Megaderma lyra* with that of *Rhinopoma Hardwickii*, I find not the least osteological connection. The genus is, evidently, far more closely related to some of the genera of *Noctilionidæ* than to *Megaderma*.

	♂	♀
	Inches.	Inches.
Length, head and body, .....	3·35	3·6
"    tail, .....	1·15	1·25
"    ditto, free from membrane, .....	0·5	0·4
"    head, .....	1·2	1·3
"    ear (anteriorly), .....	0·9	0·9
Breadth ditto ditto, .....	0·5	0·5
Length, tragus, .....	0·24	0·24
Breadth, ditto (greatest), .....	0·17	0·18
Length, forearm, .....	2·65	2·95
thumb, .....	0·45	0·45
"    second finger, .....	4·4	5·0
"    fourth ditto, .....	2·3	2·8
"    tibia, .....	1·0	1·1
"    calcaneum, .....	0·85	0·9
"    foot and claws, .....	0·55	0·65

*Fam.* VESPERTILIONIDÆ.

Genus. VESPERUGO Keys. Blas. Sub-genus *Pipistrellus*, Gray.

PIPISTRELLUS LEUCOTIS, Dobson, n. sp.

Ears triangular with rounded tips; outer margin slightly concave beneath the tip, then convex, emarginate opposite the base of the tragus, and terminating in a small lobe. Tragus slightly curved inwards and rounded at the tip. Glands of upper lip well developed, causing a slight depression on the face behind the nostrils. Tail long, wholly contained within the interfemoral membrane. A well-defined, rounded lobe posterior to the calcaneum.

Ears, sides of face about the eyes, interfemoral membrane, antehumeral membrane, and that portion of wing-membrane along the sides of the body, white, very translucent; remaining portion of wing membrane sepia, traversed by white reticulations. Fur, on the upper surface, black at the base of the hairs for about half their length, remaining portion light yellowish brown; beneath, somewhat similar.

The fur of the head extends forwards as far as the labial prominences which are thinly covered with a few short hairs; in front of the ear and about the eye the side of the face is almost naked. On the upper surface the fur of the body extends outwards, covering the proximal third of the humerus and the wing-membrane thence, backwards, to the knee joint; posteriorly, the anterior third of the interfemoral membrane is covered; beneath the fur of the abdomen extends upon the wing-membrane to nearly the same extent as on the upper surface, and the interfemoral membrane is clothed with a few, short hairs.

Upper incisors long, blunt, with a distinct cingulum; outer incisors minute, scarcely exceeding in vertical extent the cingulum of the inner ones, placed close to their sides, and separated from the canines by a small space on either side. First small premolar in the upper jaw, in the angle between the closely approximated canine and second premolar, very minute, not distinguishable without a lens.

The following are the measurements of two adult male specimens. The measurements in the first column are those of a specimen in the Indian Museum from Rajanpúr, sent by Dr. W. F. Murray, Assistant Surgeon 3rd Panjáb Cavalry, and not previously described; the second column relates to the Kachh specimen.

*Tab.*—Rajanpúr, Panjáb frontier; Kachh.

	Inches.	Inches.
Length, head and body, .....	1·7	1·8
"    tail, .....	1·5	1·55
"    head, .....	0·65	0·65
"    ear (anteriorly), .....	0·55	0·55
Breadth, ditto, .....	0·35	0·35
Length, tragus, .....	0·22	0·23
Breadth, ditto, .....	0·07	0·07
Length, forearm, .....	1·30	1·35
"    thumb, .....	0·2	0·22
"    second finger, .....	2·25	2·25
"    fourth finger, .....	1·7	1·7
"    tibia, .....	0·5	0·5
"    calcaneum, .....	0·55	0·55
"    foot and claws, .....	0·25	0·25

Besides these four species the only other bat I observed was a large *Pteropus*, of the size of *Pt. medius*, Tem.; I saw it on several occasions about Bhúj, but failed to secure a specimen.

#### Insectivora.

The only shrew which I obtained, and which is far from common, belongs, according to Dr. Anderson's determination, to *Crocidura murina*, Lin. Of hedgehogs also one species occurs. It represents a new species.

#### ERINACEUS (HEMIECHINUS\*) PICTUS, n. sp.

Head elongate, pyramidal; snout produced, considerably extending beyond the lower jaw, with the nostrils somewhat swollen, representing a longitudinal slit on the upper side; ears moderate, obtusely rounded at tip, and rather abruptly truncate laterally; a very conspicuous, almost perfectly nude,

\* Fitzinger (Sitz. Akad. Wien, M. N. Klasse, 1867, vol. 56, part I, p. 858,) uses this name in a generic sense, as distinct from *Erinaceus*.

tolerably broad space extends from the hind head towards the middle of neck; spines, beginning on neck slightly in advance of a line connecting the anterior basal edges of the ears, almost regular in young, but distinctly irregularly\* interwoven in the more adult; each spine white on the basal half, then with a broad blackish brown ring, followed by a yellowish white tip, only the extreme point appearing slightly dusky; each is further surrounded by sixteen to twenty longitudinal grooves, separated by much broader and very finely tuberculated ridges; the minute tubercles being laterally compressed. Limbs long and slender, each with five claws; tail very short and concealed.

Snout, extending on the upper side as far as between the eyes and from there stretching as an oblique band through the eyes to the base of the neck, dark brown with very few whitish hairs intermixed; ground colour of ears brown, but thickly set with whitish hairs, lower jaw round the edges brown, chin and throat whitish tinged with brown in the young, almost perfectly white in adults; fore-limb beginning at the middle of the forearm, the hind limbs entirely, including the region of the vent between them and at their sides, and the tail chocolate brown; soles of feet blackish and all the claws white. Moustaches brown, whitish towards their tips, the longest nearly two inches. An oblique streak in front of and below the eye to the angle of the mouth, hind head and all round the neck, involving the base of the ears, the entire lower side from the chin, including nearly half the length of the fore-limbs, and extending backwards as far as the region between the hind-limbs white, the lower side being thinly clad with hairs which are throughout arranged in small tufts, each tuft evidently corresponding to a dorsal spine, as if each of the spines had been dissolved into its original component parts.

Total length of a specimen 5·5 inches; distance from tip of snout to anterior angle of eye 0·8; length of ear 0·55, and the greatest breadth about 0·4; length of carpus to tip of claws 0·8, the same of foot 1 inch, the heel tubercular; tail 0·4 inches, thickly covered with hair.

Besides this specimen which is the only one I preserved, I saw several others in the western part of Kachh, and some were decidedly larger; one measured 6·3 inches, the distance from the tip of snout to the eye being nearly 1 inch, and to the base of the ear nearly 1·5 inch. There are also several specimens of this species in the Indian Museum from the North West Provinces about Agra, and from Rájputána. One of these measures nearly 7 inches from tip of snout to end of tail.

\* The regularity of the spines seems very much to depend upon the attitude of the animal. When the animal is at rest, and the spines are in their natural position, they are as a rule regularly directed backwards, but the moment the animal rolls in its body, they become interwoven.

In comparing the present species with the descriptions of hedgehogs known from Asia and adjoining territories, and which belong to the section *Hemiechinus*,—characterized by having the ridges on the spines tuberculated and five toes on all feet,—I find that *E. æthiopicus*, Ehrenberg, = *E. brachydactylus*, Wagner, is most closely allied to it. It slightly differs in coloration, in having the forehead white, the chest brownish; each of the tubercles on the spines is seated on a separate eminence, and the tail is longer. Other similarly coloured species are *E. algirus*, *ægypticus*, *pallidus* and *libicus*, all from North Africa, but they more or less differ in structure. Besides that there are two other African species *E. platyotis* and *pectoralis*,\* both of which are quite different in coloration, and *E. auritus*, Pallas and *hypomelas*, Brandt, are from Northern Asia.

From India Jerdon describes out of the section *Hemiechinus*, *E. collaris* and *micropus*, the former being found in Northern, the latter in Southern India.

In *collaris* the ears are externally somewhat indented, but not to any particularly large extent. The spines are rather long and cylindrical, usually with a broad black tip, each is surrounded by 22 to 24 longitudinal grooves separated by equally broad ridges, which are rather sharp and somewhat distantly finely tuberculated.

Very closely allied to *collaris* are no doubt Bennett's *E. Grayi* and *spatungus*, both from the Himalayas; but until authentic specimens had been examined, it does not appear advisable to identify all three.

In *E. Grayi* each spine is stated to be yellowish white for more than half its basal length, followed by a narrow blackish ring, and again white at the tip. The coloration of the head and underside does not appear to differ from that of *collaris*. The ears are said to be long, obtusely pointed, but scarcely thickened towards the tip, and laterally not emarginate.

*E. spatungus* is said chiefly to differ by the regular position of the spines, but this is a character which very much depends upon the position of the body. It seems probable that the type specimen is only a young one of *E. Grayi*, should this really prove to be distinct from *collaris*.

*E. mentalis*, Gray, also from the Himalayas, is recorded as distinguished from others by a black chin; nothing further is known of it.

In *micropus*, which is undoubtedly the same as *nudiventris*, the spines are thin, rather short, with a long point and of a similar colour as in *E. pictus*, but each is surrounded by 17 or 18 longitudinal grooves, separated by only very little broader ridges which are provided with moderately distant blunt, and nearly rounded tubercles.

From Afghanistan, Blyth described *E. megalotis*,† which in colouring more resembles *hypomelas* than *auritus*, each spine being dusky at base and near the middle, and blackish brown towards the tip, which again is paler. Each spine is further surrounded by about 28 to 30 longitudinal fine furrows, separated by about equally broad and fine ribs, which are minutely tuberculated; some of the ribs are occasionally thinner than others. This character alone separates *megalotis* from the two other allied species with large ears.

In looking over the specimens of hedgehogs in the Indian Museum I noticed an apparently new species which was lately collected by Dr. Henderson when accompanying the Yarkand expedition, and I shall give a short description of it under the name of

\* Fitzinger in Sitzb. Akad. Wien, M. N. Klasse, vol. 56, part I, p. 859.

† Journ. Asiat. P. B. vol. XIV, p. 353 and vol. XV, p. 170.

*Erinaceus (Hemiechinus) albulus*, n. sp.

Snout very long and pointed, ears moderate, ovate at tip; spines irregularly placed, much as in *pictus*, but comparatively longer and thicker; each of them is dusky at the base, then up to half its length purely white, followed by a blackish brown ring, its breadth being only about one fifth of the total length, tip largely white and rather abruptly pointed, the result being a prevalence of white colour on the upper surface of the body. There is no perceptible nudo space between the ears, and the spines begin immediately on the hind neck, and the largest on the back are fully one inch long. Each spine is surrounded by 24 to 26 fine longitudinal furrows, separated by minutely tuberculated ridges, scarcely wider than the furrows. The tail is almost as short as in *pictus*.

Head entirely rufescent above and at the sides, except upper mandible towards the angle of the mouth, this being white; base of ears also white, as well as the entire underside, which is thickly set with long hairs, passing into a slight rufescent shade on the sides of the body. Ears, lower portions of front and hind feet and tail dusky brownish, being thickly intermixed with short, white hairs; moustache brown, whitish towards the tip. Claws strong, five on each foot, very pale brownish.

The only specimen measures very nearly seven inches; the ear slightly exceeds one inch; distance from tip of snout to the angle of the mouth not quite one, to the ear slightly more than one and a half inch. Dr. Henderson gives the locality, 'Langur near Sanjn; Yarkand,' and the native name 'Keepa.'

The only known form to which the present species is closely allied is *E. lybicus*, Ehrenb., which has similarly grooved and similarly coloured spines, but they are decidedly shorter, and the coloration of the other parts of the body is different.

From all the above noted species which, as I stated, are referable to the section *Hemiechinus*, *E. albiventris*, Wagn., differs by having only four toes on the hind feet, and the spines sulcated and smoothly ridged. The type specimen, which is 6.5 inches long, is believed to have come from the East Indies, but its precise locality is unknown; it is in the Berlin Museum. The distinctive characters noticed also occur in the Egyptian *E. Prumeri*, and Fitzinger separates both as '*Perochinus*.'

The true *Erinacei* have five toes on each foot and smoothly striated spines. Of the five species known only *E. europæus*, namely the Siberian variety, may be found in the Himalayas.

**Carnivora.**

*Ursus labiatus* occasionally occurs in the Wagur district, and I was told of a specimen having been shot on Béla, but it is evidently only a very rare straggler.

I have not on a single occasion seen either a marten (*Martes*) or a weasel (*Mustella*), though I was told that at least one species of each does occur.

Of the *Felidæ*, both the lion (*F. leo*) and the tiger (*F. tigris*) extremely rarely occur as stragglers from Káthivár, they had been formerly shot in Kachh territory, and a century ago they might have been more common.

The larger variety of the pard (*F. pardus*), usually called panther, is up to the present time not uncommon in some districts. It keeps to the thinly wooded and rocky parts of the country, and its favourite sport constitutes a monopoly with the present Rao of Kachh.



The common jungle cat (*F. chaus*) is the only representant of the smaller *Felidæ*, and though not abundant it is met with occasionally throughout the country.

The red lynx (*F. caracal*) is, however, certainly rare, as it likewise is in other parts of India. I have only seen one animal shot some years ago by the Rao of Kachh, but I heard of it in different parts of the country. Like the pard, it seems to be very fond of digging after *Uromastix Hardwickii*, which in common with some of the inhabitants it appears to find a very tasty meal.

*F. jubata*, the hunting leopard, was seen by me only on one occasion in the Wagur district (north of Chitrore), but I could not obtain any information as to its further occurrence. It seems to be scarcely known in the western and southern parts of Kachh.

The striped hyæna (*H. striata*) also occasionally occurs in the eastern parts of Kachh, and about the Rann islands. I have, however, nowhere heard of a single *Viverra* or a *Paradoxurus*, which no doubt prefer forest to open country.

132. *Herpestes griseus*, called by Jerdon the 'Madras Mangoos,' is the only species of this genus, and generally distributed, though not very common. Body of a male 18", tail 15"; a female which I shot was somewhat larger. The general colour of the fur above is (in winter) brown, grizzled with white; the longer hairs are adpressed and very long, particularly at the sides, each with four to five dark brown rings, separated by pale white, the two colours passing into each other by a rufous brown tint, which, during the summer, in some individuals at least, appears to prevail over the dark brown, and when in older skins the brown fades, the rings may be described as rufous, but they certainly are not so in fresh skins. The white rings generally have barely a tinge of yellow, in some specimens they may be said to be pale fawn colour. The elongated hairs at the lower side are broadly tipped with fulvous fawn, and those at the end of the tail are mostly of that colour, which in so far may be said to be concolorous with the body. The sides of the snout, particularly in front and about the eyes, are distinctly rufous, more so in the male than in the female, and the entire head is also tinged with more rufous, than any other part of the body. Ears light brown, thickly set with short hair, more mixed with white in front than behind. General colour below fawn, the rings on the hair being pale brown and on many nearly obsolete. Feet in front rufous brown, speckled with white; claws brown, pale towards the tips; soles dark fleshy brown; muzzle reddish brown.

The Indian Wolf (*Canis pallipes*) is tolerably common in the Wagur district and on the Rann, but less so in Western Kachh, while the jackal (*C. aureus*) abounds everywhere. Pariah dogs are, as may be imagined com-

mon enough, and some very much resemble in structure and colour the wild dog (*Cuon rutilans*), but I have not heard of the occurrence of this latter in a wild state.

Both the Indian and the desert fox, *Vulpes bengalensis* and *leucopus*, the latter generally called the silver-tailed fox, occur; the former I have shot only in the north-eastern districts, but the latter appears to be more generally distributed, though not very common.

### Rodentia.

The homely *Sciurus palmarum* is the only species of squirrels to be met with, both about habitations and in the Kundu jungles.

The ground is claimed by the desert Jerboa-rat, which Jerdon identified with (No. 171) *Gerbillus\** *erythrourus*, Gray.† I do not think that there is any other animal equally common throughout Kachh, as is this rat; it does of course not frequent stony and hilly ground, but is most abundant in the sandy districts between bushes, as well as between fields and on grassy plains; its barrows sometimes extent over hundreds of square feet without interruption. The size and colour of Kachh specimens perfectly tallies with Jerdon's description. Near habitations it usually comes out only in the morning and evening to feed, but far away from them it is to be seen out of its hole at all hours of the day. As a rule, it feeds, I believe, on roots of various herbaecous plants, and more rarely on seeds.

I hardly need to mention the occurrence of the brown rat (*Mus decumanus*) and of the common Indian mouse (*M. urbanus*).

*Hystrix leucura* is the common porcupine of the country; it is usually found on higher undulating desert ground, thinly covered with jungle, or on more elevated plateaus where brushwood occurs.

*Lepus ruficaudatus* is very abundant throughout Kachh. There is, (at least in younger specimens) a conspicuous white band from the nostril through the eye; the ears are lined internally with dull white, and externally towards the tips with blackish brown or black; the tail has in the young only a slight rufous tinge above.

### Ungulata.

*Equus onager*, the wild ass, is entirely confined to the most uninhabitable and desert parts of the country near the Rann, or the Rann itself with its small islands. I have seen it on two or three occasions in crossing the Rann, but an approach to it even within half a mile was out of question.

*Sus indicus* is generally distributed, and fine sport may be had in suitable, temporarily swampy, localities, mostly near the Rann. Occasionally,

\* Most naturalists accept for the Africo-Asiatic species the name *Meriones*.

† Comp. Jerdon, Mamm. Appendix, p. III.

I also met with solitary specimens, or small families of young, within the hills, as at Jora.

The common Indian antelope, *Antelope bezoartica*, is only found in the eastern parts of Kachh, towards Rájputána, while the Indian gazelle, *Gazella Bennetti*, occurs abundantly throughout the country. Jerdon (Ind. Mamm. p. 281) says that '*Gazella Christii*, Gray, from Sind and Kachh, is said to be paler, and with the horns more slender, and smaller than in the Indian gazelle, and with the tips abruptly bent inwards.' I have seen a great number of animals shot in different parts of Kachh, and preserved also a few skins, but they do not exhibit the least difference from the 'Chinkára' of Central and Northern India.

#### AVES.

In the subjoined list I have included only those species of which I procured specimens, and of the identity of which I had been able to satisfy myself. In addition to these I observed a small number of others, and although the identity of some of them appeared to me at that time tolerably certain, I shall note them separately; for with the number of very closely allied forms one cannot be cautious enough in avoiding mistakes in determination. Among the species which I have not procured are: *Astur palumbarius* which I saw on several occasions kept by falconers, but I could not obtain information that the specimens were procured in Kachh. At the beginning of November, I noticed on the Jora hills a solitary specimen of a *Centropus*, it was either *rufipennis* or *viridis*. Both, *Alauda gulgula* and *cristata*, do, I believe, occur, and I was under the impression that my shikari secured specimens, but on examination none were represented. *Carpodacus erythrinus* was seen on two occasions in January. I am also tolerably certain of the occurrence of *Tringa minuta*, *Numenius arquata*, *Herodias alba*, *Anas boschas*, *Mergus castor*, *Casarca rutila*, *Podiceps cristatus*, *Anser indicus* and *cinereus*; all these, besides a great number of other water-fowl, were seen on the large lake at Bhimsir near the Denodúr hill, and also S. W. of Barasir in the Charvar range. At the former locality I also observed one or two species of *Gallinula*, and a small *Porzana*. On two occasions I saw in the western part of Kachh what at the time I took for solitary specimens of *Ciconia alba*, and on one occasion a solitary *Cic. nigra*. When crossing the Raan from Kachh to Pacham early in November, I noticed several swans, but at too a great distance for it to be possible to form an idea as to the species the birds belonged to; a large *Cursorial* bird was also rather common, but I could not get a shot at him. It had the appearance of a gigantic *Chettusia*, being about double the size of *Ch. gregaria*, and somewhat similar in coloration.

2.\* OTOGYPS CALVUS. Not common.

5. GYPS BENGALENSIS. Very common.

I examined several nests in the second half of December and in January; all contained only one egg. On the 11th January at Kunria, one nest had a nestling which must have been a week old.

6. NEOPHRON GINGINIANUS. Very common.

8. FALCO PEREGRINUS. Not common.

10. F. JUGGER. Very common.

During January, I have generally seen them in pairs, and on the 10th Feb., near the village Tappur in Eastern Kachh, a pair had a nearly finished nest on a large Kundú, near the edge of a tank. The bird is a great favourite with native Falconers.

12. F. BABYLONICUS.

Comp. Jerdon in *Ibis* for 1871, p. 240.

Only a single male specimen was seen and shot near Kantkote in Wag-gur district, on 12th January.

16. HYPOTRIORCHIS (TURAMTIA) CHICQUERA.† Very common.

17. TINUNCULUS ALAUDARIUS. Common.

23. MICRONISUS BADIUS. Common.

I shot one male and two females in December and January, all had the iris bright yellow. *M.*—wing 7·5, tail 6, tarsus 1·8. *F.*—wing 8·6—8·9, tail 7·2—7·4, tarsus 2 inch.

24. ACCIPITER NISUS. Not common.

25. A. (HIERASPIZA) VIRGATUS. Not common.

29. AQUILA BIFASCIATA, Gray and Hardw. Not common.

Comp. Brooks in *Proc. Asiat. Soc. Beng.*, April, 1872, p. 65.

Jerdon says that *bifasciata*, Gray, is the same as *vittala* of Hodgson.

29. A. FULVESCENS. Very common.

45. BUTEO FEROX. Very common.

I have seen hundreds of these birds, all were of the *B. cannesccns* type, but not one of the uniform coloured type, called *fuliginosus* by Hume. The latter I got from Kotegurh near Simla. (Comp. Jerdon in *Ibis*, 1871, p. 338).

48. POLIORNIS TEESA. Common.

51. CIRCUS PALLIDUS, Sykes = SWAINSONI, Smith. Very common. Gray (*Handlist*, I, 37) gives Sykes's name the priority.

55. HALIASTUR INDUS.

Only seen near the sea shore.

\* The numbers prefixed to the names correspond with these in Jerdon's 'Birds of India,' or their nearest allies.

† I would decidedly prefer adopting the subgeneric name *Turamtia* for that of *Chiquera*, than altering the latter well known specific denomination to '*typus*.'

56. *MILVUS GOVINDA*. Very common.

The details in coloration are exactly as recorded of *govinda*, though they do not in any essential point appear to differ from those of *affinis* (Comp. Hume, Scrap-book, p. 320). Measurements of two specimens: wing 17·5 and 17; tail 10·6 and 11·25; tarsus 2·1, midtoe without claw 1·6 and 1·8, its claw straight 0·7 and 0·75; bill from gape 1·7 and 1·65 inch. This is as far as I saw, the only kite found throughout Kachh. A pair was breeding on a tree near Sumrasir on the 14th November.\* Gray (Handl., I, 26) gives *melanotis*, Tem. and Schlegel, which was shewn by Blanford to be identical with *M. major* of Hume, as a synonym of *govinda*, but he places *affinis* of Gould in a distinct subgenus. *M. affinis* is added to the Indian fauna by Jerdon in Ibis for 1871, p. 343; but are these two races really specifically distinct?

67. *OTUS VULGARIS*. I have seen it only on three occasions.

69. *BUBO (URRUA) BENGALENSIS*. Not uncommon in rocky ravines.

76. *ATHENE BRAMA*. Very common.

82. *HIRUNDO RUSTICA*. Common.

Wing 4·6; outer tail feathers 3·6, central 1·8; tarsus 0·4; midtoe and claw nearly 0·7 inch.

84. *H. (UROMITUS) FILIFERA*. Common.

This, Jerdon writes, 'must stand, it appears, as *H. ruficeps*, Lichtenstein,' but he thinks that the differences, said to exist between the Indian and African form, as pointed out by Mr. Gould, 'may perhaps still hold good.' Mr. Gould (Birds of Asia, Part xviii) says, that African examples differ by being smaller, by having a lesser amount of rufous on the top of the head, and a shorter tail. Now, these must be admitted to be very variable characters, in the Indian bird at least. I measured specimens with the wing varying from 4·4 to 4·8, and with the central tail-feathers from 1·3 to 1·6 inches long. The rufous on the head changes in Kachh specimens, (shot in winter), from deep rufous brown to a pale rusty.

85. *bis H. (LILLIA) ERYTROPYGIA*. Very common.

Wing 4·1 to 4·3, tail 2·8 to 3·3. True *daurica* occurs in the Satlej valley, where it is far from rare, and I also have a specimen of it from Western Bengal, shot by Mr. Ball during the winter of 1870; it is, therefore, not a restricted hill form. It differs not only in size, but also in the form of the bill, this being in *daurica* more contracted towards the tip and slightly longer.

90. *PTIONOPROGNE CONCOLOR*. Very common.

Wing 4 to 4·2, tail 1·9 to 2 inches, the central feathers from 0·1 to 0·2

\* I have seen a pair of *govinda* copulating on 5th September, and before I left Calcutta on 10th October, they had their nest ready in front of my window.

inches, shorter than the outer ones. The species is very abundant and its favourite haunt are tanks or grassy slopes of hills.

91. *PTIONOPROGNE RUPESTRIS*. Not very common.

I saw the species repeatedly hunting over tanks, in company with *H. rustica*. The measurements are slightly smaller than those given by Jerdon.

112. *CAPRIMULGUS ASIATICUS*. Not common.

113. *C. MAHRATTENSIS*. Shot a single specimen on 26th January, at Daiselpúr in Wagur district, between fields. The bird perfectly agrees with that described by Jerdon.

117. *MEROPS VIRIDIS*. Very common.

123. *CORACIAS INDICA*. Common.

129. *HALCYON SMYRNENSIS* (= *FUSCUS*). Common.

The largest specimen measures; wing 5, tail 3·5, bill at front 2·3, from gape 2·9 inch. (Comp. *Ibis*, 1872, p. 4.)

134. *ALCEDO BENGALENSIS*. Not common.

Wing 2·8, tail 1·3, bill at front 1·5, from gape 1·9, tarsus 0·35 inch.

136. *CERYLE RUDIS*. Common.

Wing 5·2 to 5·6; tail 2·75 to 3, bill at front 2·2 to 2·5, tarsus 0·4 inch. Of two pairs shot the males are slightly larger than the females.

148. *PALEORNIS TORQUATUS*. Very common.

160. *PICUS (LEIOPICUS) MAHRATTENSIS*, var.

An idem *P. Blanfordi*, Blyth!

This is the only woodpecker which I have met with in Kachh. It would be difficult to identify it from Jerdon's account, and I give, therefore, a more complete description.

Forehead and part of top of head pale yellowish brown, with a more or less distinct golden lustre, (not pure yellow as Malherbe calls it); in the male occiput crimson, laterally extending to above the eyes, in the female dull yellowish brown, in both the occipital feathers are conspicuously lengthened; neck above with a broad uniform dark brown streak from the occiput downwards; lower neck, back and rump with longitudinal brownish black and white streaks, each feather being black along the centre; on the base of the lower tail coverts the white predominates, but of the longer tail coverts each has a large triangular central spot; tail blackish, each feather with 5 or 6 transverse, on the quill interrupted white bands; shorter wing coverts nearly uniform brownish black, longer coverts and all the wing feathers with along the middle of each feather interrupted bands, primaries dusky brown, and the white on them suffused with pale sulphur, secondaries and tertiaries much darker, particularly on the outer web. Lores, round the eye, about the angle of the mouth and chin in front fulvous white, ear coverts fulvous-ashy white or pale ash; sides of neck, chin and breast

in the middle almost pure white, a brown broadish band extends from behind and below the ear coverts to the sides of the breast; lower plumage and under tail coverts dull white with a brownish streak to each feather, a crimson patch on the middle of the abdomen; the white bands on the tail feathers are tinged with pure yellow, particularly towards the tips of the feathers. Bill plumbeous; feet blackish ashy. Wing 3·75 to 3·9; tail 2·3 to 2·4; bill at front 0·8 to 0·9, from gape 1· to 1·1; tarsus 0·6 inch; foot about 1·5. Fourth primary the longest, first 2·2 inch. shorter, second 0·4 and third 0·05 shorter than the fourth which exceeds the fifth by only a trifle.

These are the average measurements (from skins) of three males and two females; the former differ from the latter only by the crimson occiput, and sometimes also by a slightly smaller size, &c.

Not common, but occurring throughout Kachh, in the thinly wooded parts of the province, on trees as well as on *Euphorbia* bushes. It is a rather shy bird, and has a particular liking to hunt for insects towards dusk; I shot it often when it was almost dark, flatly clinging to the bark of a tree.

Looking at the comparative small size of the Kachh birds, I was at first inclined to separate them as a distinct species, but, on the suggestion of Mr. Hume, and after careful comparison, I am convinced that they represent nothing more than a local race of *Maharattensis*. I find that all the specimens of the latter from Bengal and Central India in the Museum have less white above, the white spots on the feathers being smaller, and that their 1st primary is a little shorter and narrower, being 0·8 inch. long, while in the Kachh variety it is usually broader and 0·9", or even 0·95" long. But in both it has three white spots on the inner web and one at the base of the outer web. The proportions between the other primaries agree in both. The bill in Central India *Maharattensis* is a little slenderer at the base and altogether somewhat longer. The wing, I find, to differ between 4 and 4·3 inches, but a specimen said to be from Simla has the wing only about 3·8 inch., and Beavan (*Ibis*, 1865, vol. I, p. 410) gives the wing of a female from Manbhúm as 3·88 inch.

Blyth's *P. Blanfordi* (*Journ. A. S. B.*, XXXII, p. 75), 'is just barely separable as a race,' as its author truly remarks. I do not believe that it differs specifically; that is, I believe, that the Barmese bird is connected with true *P. Maharattensis* by intermediate forms of indefinable gradations. The type specimen has the wing 4, tail 2·45, tarsus 0·7, bill at front 0·9 inch. The white blotches on the upper plumage are again slightly larger than in the Kachh variety, but in all details of coloration both perfectly agree. The first primary is in the Barmese type only about 0·6 inches long, and the 2nd and 3rd are comparatively also a little shorter, but they do not appear to have attained their full size in that specimen. It is noteworthy

to observe that such a marked form of a wood-pecker, as *P. Maharattensis* represents, deviates from the type on the two extreme limits of its geographical distribution in an exactly similar manner, namely, by decreasing in size and adding more white to its plumage.\*

214. *EUDYNAMYS HONORATA*, Linn.

*E. orientalis* apud Jerdon. Comp. Ibis for 1869, vol. v, p. 333 and for 1872, p. 15.

Rare during the cold and dry seasons, but said to be very common in the rains, when it breeds.

220. *TACCOCUA SIRKEE*.

Above dusky brownish grey with a slight greenish lustre, which is most distinct on the tail, tertials, secondaries and tail feathers with close duller crossbars, only perceptible in certain lights; top of head with a slight rufescent tinge; feathers on head and neck black-shafted, glistening, bristly in front, the remainder on the upper side brown shafted; lores and chin whitish, sometimes with a faint reddish tinge, above and below the eye narrowly white, bristles on eyelashes black, pure white at base; upper breast ashy very slightly tinged with ferruginous, lower breast, vent, sides, lower wing coverts and tibial feathers pale ferruginous; lower vent and lower tail coverts dusky ashy brown; outer tail feathers dark brown, broadly tipped with white. Average measurement of 3 specimens: Wing 6—6·25; tail 9 to 9·5; tarsus 1·6 to 1·7; bill from gape 1·5 inch., cherry red, yellow towards the tip and the upper mandible blackish at the side.

I have seen this bird only on a few occasions; it hides itself usually in *Euphorbia* bushes, and is most difficult to flush. Often it manages to run from one bush to another at a tremendously rapid pace, pressing its body to the ground like a rat. I have seen it feeding on insects on the ground.

\* I take this opportunity of drawing attention to what appears to me to be often an *a priori* somewhat unnatural explanation of facts. When a naturalist has noticed and described a form which combines the characters of two well marked races, or species, and the geographical distribution of which falls within the limits of the two; other naturalists are, often without hesitation, ready with an explanation in stating, that the intermediate form is 'evidently a hybrid between the two.' This in many instances looks very plausible, but is it natural? or even *a priori* probable? These questions seem to me to require thorough study and examination. Why should we *a priori* presume that there exist two entirely distinct types? Does it not look more natural to assume *a priori* that the so called intermediate form within the geographical limit of a certain type is the typical species, and that, as it extends, it deviates in a somewhat different manner in various directions? and that the peculiarities acquired in order to maintain subsistence at certain localities may even remain constant and be inherited within those certain local limits?—I think in many cases this latter explanation will prove to be the more probable one, although I do not by any means wish to abandon altogether the former.



## 234. ARACHNECHTRA ASIATICA\* = CURRUCARIA, Linn. Common.

On one occasion I shot a young male while sitting on the top of a tree, about 40 feet high, and engaged in occasionally darting after passing insects, which it appeared to catch, every time returning to its perch like a fly-catcher. In four males, wing 2·05 to 2·2 inches, tail 1·25 to 1·5; bill 0·65 to 0·7; tarsus 0·6.

255. UPUPA NIGRIPENNIS, Gould, vel *Ceylonensis*, Reich.

Comp. Jerdon, Ibis, 1872, p. 22.

Wing 5·3, tail 3·8, bill at front 1·75, tarsus 0·8 inch. The posterior feathers of the crest have distinctly white preceding the black tip, but the first primary has no white and the succeeding have it on both webs. The 4th primary is barely longer than the 5th, the 1st is 2·5 inches shorter than the 4th; the 2nd is 0·7 inches shorter, and the 3rd 0·1 shorter than the 4th. There is scarcely any ashy colour on the sides of the neck or breast.

Jerdon says, that the 'white spot on the first primary is occasionally present,' I may add, it is also the case as regards the white on the crest. What is then to remain to be the distinctive character between the present form and *epops*? I have great doubts about the Indian hoopoe being separable as a sufficiently distinct and definable species. There is no distinction in plumage, and the only difference I can see, in comparing about half a dozen specimens of each, is, that *nigripennis*, or *Ceylonensis*, is a smaller and lighter bird, with the first primary shorter and narrower. Still I cannot but doubt, that even these characters are so far constant, as to be of any use in defining distinct species. I am sure the European, Indian and even the Barmese hoopoe are merely local races of one species, not possessing a single character constantly distinct in one from the other.

I only saw few specimens at the end of October and in the beginning of November, but towards the end of the latter month, they became more numerous; it is, however, not a very common bird in Kachh, and must be, to a certain extent at least, migratory.

## 256. LANIUS (COLLYRIO†) LAHTORA. Very common.

Wing 4·1 to 4·4, tail 4·4 to 5; bill at front 0·6 to 0·7; tarsus 1·1 to 1·3 inch.

Some specimens have a distinct white superciliary edge above the black, others no trace of it; the inner plumage on breast and vent sometimes has a very slight creamy wash, exactly as is often the case in the European

\* I do not see the benefit of changing the name *asiatica* to that of *currucaria* as suggested by Jerdon, both being Linne's names. The former is retained by G. R. Gray in his Hand-list.

† G. R. Gray adopts *Collyrio*, Moehr., 1752, for the group of *Lanius excubitor*, reserving Linne's name *Lanius* for the type of *L. cristatus*.

*excubitor*; all the tail feathers have at least their extreme tips white, even the central ones, but only visible after a fresh moult, (which is also the case in the two next species).

A full account of this species will be found in Proc. Zool. Soc. London, for 1870, p. 595, by Mr. Dresser. On p. 596 the author says, 'rump and upper tail coverts white,' the description being taken from an old Pan-jáb bird. Now, it is strange that in about a dozen of specimens which I shot in Kachh, and some of which are decidedly very old birds in full plumage, the rump and upper tail coverts are albescent grey, in some the latter may be called greyish white, but that is the utmost limit of white. In fresh moulted old specimens the extreme terminal edges, of the upper tail coverts are blackish, but they appear very soon to wear of. Perhaps the distinction of possessing the rump and upper tail coverts white applies to the winter plumage, which I do not know.

257. *L. ERYTHRONOTUS*. Rare.

260. *L. VITTATUS\** (= *Hardwickii*, auctorum). Very common.

262. *L. ARENARIUS*.† Rare.

Bill at front 0·42 to 0·45, wing 3·5 to 3·6; tail 3·3 to 3·45, tarsus 0·9. These measurements are somewhat smaller than those generally given of the species. The young is striped in the usual way on the sides of neck and of the body, and on the chest. The light coloured band on the rectrices, such as is noticed by Viscount Walden in *Ibis*, vol. III, p. 224, is only occasionally present, perhaps in old birds. The species migrates during the summer to Western Tibet, where I saw it in the Indus valley.

265. *TEPHRODORNIS PONDICERIANA*. Not common.

The wing varies (in four specimens shot) between 3·3 and 3·4, none is 3·5 inch. The two outer tail feathers on each side are white, except at the base and towards the tip, there being only the sub-terminal outer, or both webs dusky; the 3rd and 4th last tail feather on each side generally have also a white edge about the middle of the outer web.

276. *PERICROCOTUS PEREGRINUS*. Very common.

The orange wing patch does not extend on any of the outer webs of the first 5 primaries. Wing 2·5 to 2·6, tail 2·7 to 3; tarsus 0·6 inch. (not  $\frac{9}{10}$ ).

277. *PERICROCOTUS ERYTHROPYGIUS*. Not common.

I have occasionally seen flocks of this species hunting over high grass on dried up portions of tanks. In the jungles it is more often seen single, or in pairs.

\* *Ibis*, 1868, iv, 316.

† Comp also Jordon in *Ibis*, 1872, p. 115.

278. *DICRURUS\** *ALBIRICTUS*, Hodgs. Very common.

Average of four specimens, young and old: bill 0·7 to 0·8; wing 5·4 to 5·65; tail 5·8 to 6·4, tarsus 0·8 inch.

I have never seen a herd of either cattle, or sheep, or goats, without a number of these birds accompanying it; they start with the herd in the morning and return with it in the evening.

The specific name *macrocerus* is restricted for the Java species.

292. *LEUCOCERCA AUREOLA*, Less. = *albofrontata*, Frank. Very rare.

361. *PETROCOSYPHUS CYANEUS*. Rare.

365. *PLANESTICUS ATROGULARIS*. Rare.

(Comp. Journ. A. S. B., 1868, vol. xxxvii, Pt. II, p. 35.)

Bill at front 0·6 to 0·7; wing 5·3 to 5·4; tail 4 to 4·1, tarsus 1·25.

385. *PYCTORIS SINENSIS*. Very rare.

Bill 0·43; wing 2·55; tail 3·7; tarsus 1 inch.

438. *CHATORHEA CAUDATA*. Extremely common.

459. *OTOCAMPSA LEUCOTIS*. Very common.

Wing 3·1 to 3·4; tail 3·2 to 3·5; tarsus 0·75 to 0·8 inch.

462. *PYCNONOTUS CHRYSORRHODES*, Lafir. = *pusillus* et *pseudocafer*, Blyth. Very common.

467. *IORA ZEYLANICA*. Very common in low tree jungle.

Size the same as that given by Jerdon. Males and females had exactly the same colouring, during the winter, but *no black* above, the hind head and back are, however, in most specimens blackish green. In this stage they appear only to differ from *typhia* by their triflingly smaller size. (Compare Hume, Jour. A. S. B., vol. xxxix, pl. ii, p. 117, and Stoliczka, *ibid.*, p. 310).

480. *TILAMNOBIA CAMBAYENSIS*.

(Comp. Journ. A. S. B., 1868, vol. xxxvii, Pt. II, p. 40.)

Extremely common throughout the country. The size is exactly the same as that of the southern form, known under the name *fulicata* in India. Male specimens which I shot in February had the upper plumage decidedly rather darker, in fact almost black, tinged with blackish brown, while specimens which I shot in November and December are almost entirely brown above, but the upper tail coverts are in all greenish glossy black. It seems to me clear that the two forms, as presently distinguished, merely represent seasonal or local faces of plumage of the one and same species.

I observe that Gray (Hand-list, I, p. 211) unites them under the name *Cambayensis*, reserving the name *fulicata*, Lath., for a South African species.

\* This generic name is retained by G. R. Gray, and *Bhuchanga* of Hodgson considered as a synonym of it; but if the birds of the type of *D. longicaudatus* should at all be distinguished in a separate group from those of the type of *D. furcatus*, Gm., Hodgson's name should be retained as a subgenus for them, though I almost doubt that a real necessity exists for it.

481. PRATINCOLA CAPRATA. Very rare.

483. P. INDICA, ? = RUBICOLA. Very common.

Comp. Ibis, 1870, vi, p. 167, and 1871, p. 27.

♀ Wing 2·65, tail 2, tarsus 0·85, bill at front 0·4 inch.

This is the only specimen I saw during the whole winter; I shot it near Bhúj on 2nd January. Gray (Hand-list, I, 228) retains the Indian Bush-chat as distinct from the European, but I still think their identity can hardly be questioned, although Indian specimens may generally be smaller; I certainly disbelieve the existence of two separable species in India as *rubicola* and *indica*. As far as I remember I have seen in 1867 European specimens with all the distinctive peculiarities in colour of *P. indica*, Himalayan specimens of which I then compared with the former.

483bis. PRATINCOLA MACRORHYNCHA, n. sp.

I shot at the beginning of 1872 two specimens of a *Pratincola*, (probably females, the sex was unfortunately not determined), which appears to be distinct from any other as yet known.

General plumage, above, dull brown, all the feathers margined with pale isabelline or fulvescent whitish, most broadly on scapulars and tertials, narrowly on the quills; upper tail coverts nearly entirely uniform pale fulvescent or sandy, only along the centre of a darker hue. Central tail feathers brown, the succeeding also brown and very pale rufescent fulvous about the basal half of both webs, (not along the shafts), the rufescent colour gradually, not abruptly, passing into the brown; outer web of last tail feather wholly sandy or pale fulvescent white, and all have pale tips which, however, easily wear off. Loes and supercilium sandy white; ears dusky. Lower plumage fulvescent white throughout, with a slight shade of cream colour, all the feathers on their basal halves are dark slaty, which is also the case on the upper plumage. Bill and feet nearly quite black. Total length about 5·2" to 5·5"; wing 2·85" to 2·9 inch., first primary nearly 1", and 1·2" shorter than the second, which is very nearly equal to the 6th and 0·24" shorter than the fourth, this being the longest; the 3rd and 5th are subequal and very little shorter than the fourth; tail 2·1 to 2·25, tarsus 0·95 to 0·97; bill at front 0·48 to 0·5, from gape 0·72; hind toe and claw 0·57, hind claw alone 0·3; mid toe with claw 0·72 to 0·73 inch. The size of the bill, which is rather narrow and Saxicoline, and the length of the legs readily distinguish this apparently new species; it is not the female of *P. rubetra*, this having the basal half of the tail white, and the bill shorter and broad at the base. It is also not a female or young of *P. caprata*, moreover the length and slenderness of the hind claw does not agree with any *Pratincola*, nor even with *Saxicola*, but strange enough with *Oreicola* (= *Rhodophila*).

One of the two specimens was shot in January near Rápúr in the Wagur district, and the other in February near Bhúj, in both cases in an open desert country with scanty low bushes. These were the only two specimens, which I saw, but possibly the bird may not be so very rare; for I could never pay undivided attention to an ornithological subject.

489. *SAXICOLA PICATA.*

Comp. Hume, in *Ibis*, 1870, vi, p. 283.

Wing 3·6 to 3·75, tail 2·5 to 2·8; tarsus 0·9 to 0·95; bill 0·4 to 0·5. The female has exactly the same distribution of the colours as the male, but the black is replaced by blackish grey, the chin is rather whitish grey and the ear-coverts somewhat rufescent.

One full plumaged male has an indistinct white stripe above the lores, and all the tail feathers are distinctly tipped white, the black being subterminal. Some apparently younger males with a dusky black plumage have the forehead paler, but none shews the very marked creamy colour noticed in Gould's *capistrata*, which was shown by Hume to be a young male of *picata*.

491. *S. ISABELLINA*, Rüppel, (= *saltatrix*, Menét.). Rare.

Comp. v. Pelzeln in *Journ. für Ornithologie für* 1868, p. 27.

Wing 3·75, tail 2·3, tarsus 1·17, bill at front 0·57. A specimen from the the Somáli country, determined as *isabellina* by Blyth in the Asiatic Society's collection (now Indian Museum), only differs in having the wing about 0·2 inch longer, (comp. Tristram's statement in *Ibis*, 1867, p. 94); both have the blackish streak between the base of the bill and the eye, and the plumage is in every detail the same.

491*bis*. *S. KINGI*, Hume. (*Ibis*, 1871, p. 29).

A single specimen was shot in Wagur in January, and I do not remember of having seen another. Wing 3·55, tail 2·3, tarsus 1; bill at front 0·56 inch. The first primary is 1·75 shorter than the 3rd. The coloration exactly agrees with the specimen described by Mr. Hume, who kindly pointed out to me the bird amongst a number of females of the next species.

492. *S. DESERTI*, Rüppel, = *atroglaris* and *montana*, Gould.

Very common. The wing of five males varies between 3·6 and 3·9, tail 2·5 to 2·7, tarsus 0·95 to 1·05, bill 0·45 to 0·5 inch. Most of the females are a trifle smaller (wing 3·5 inch.), than the males.

I have no doubt that Mr. Hume is correct (*Ibis*, 1870, vi, p. 283) in considering Gould's *S. montana* as the summer or breeding plumage of *atroglaris*. In *Journ. As. Soc.*, 1868, xxxvii, Pt. II, p. 42, I have particularly noticed the pure white on the median portions of the wing feathers on Tibetan specimens, shot during the summer, and regarding which von Pelzeln (*Ibis*, iv, p. 308) says that they agree with an Egyptian specimen of *S. deserti*, except that the latter is smaller.

I perfectly remember African specimens of *S. deserti* which I repeatedly compared in 1867; they were no doubt on the whole a little smaller (on the average, I find in a note: wing 3·5, tail 2·5, bill at front 0·45, tarsus 0·95), than most of Indian specimens, but there was not the least difference in structure and colour between the two. Now, as Indian specimens occasionally equal in size African ones, and as the former, which undoubtedly represent one species, differ in the size of the wing from 3·5 to 4 inches, I do not see,—with all respect due to the opinions of Messrs. Gould, Blyth and other eminent ornithologists—any reason in regarding the Indian birds as specifically distinct from the African *deserti*. All we can say is, that African specimens are as a rule lighter and smaller, while Indian specimens are as a rule slightly heavier and larger, but I do assert that there are to be found specimens perfectly equal in size from both countries.

494. CERCOMELA FUSCA.

I have only seen solitary specimens in the hilly districts, between low bushes. The birds have much of the habit of a *Petrocoeryphus*.

497. RUTICILLA RUFIVENTRIS.

This is the only redstart which has been observed; it was tolerably abundant from November until the end of February.

I shot 3 males and two females, and the measurements of all are considerably smaller than those given by Jerdon: ♂, wing 3·2 to 3·3; tail 2·4 to 2·6, tarsus 0·9, bill at front 0·4 inch. The females are a little smaller.

530. ORTHOTOMUS LONGICAUDUS. Common.

Lores and eyelids white. Tibial feathers pale rufous. I shot a specimen while hunting for insects between large stones of an old embankment at the Sir-talao in the south-western part of Kachh. It looked in every crevice or hole, disappearing and emerging again from among the stones, just like a wren. Other specimens I often saw hunting on the ground in *Euphorbia* bushes.

536. PRINIA GRACILIS. Not common.

Lores extending on the supraciliary edge white, tibial feathers pale rufous.

544bis. DRYMOIPIUS JERDONI, (Blyth).

*P.* ? n. sp., Journ. A. S. B., xi, p. 883 and xiii, 376.

*P. Jerdoni*, Blyth, J. A. S. B., xvi, p. 459.

Upper plumage entirely, and more or less distinctly, rufescent brown; margins of wing coverts, tertials and upper tail coverts slightly more tinged with rufescent, primaries on the edges of the outer webs pale rufescent; shoulder edge of wing, lower wing coverts and all wing feathers about the edges of the inner webs (not quite extending to the tip) rufescent whitish. Lores, supercilium and round the eye white; ear coverts white at the base,

greyish towards the tips, the grey colour also tinging the sides of neck. Lower plumage very soft, luteo-rufescent whitish, white on chin and abdomen; thigh coverts and lower tail coverts pale rufous. Tail above with rather close, but not very distinct, dull cross bars, all except the two centre feathers with an indistinct subterminal dark band and a well developed dull white tip. Bill above dark brown, paler towards the edges and below; feet pale fleshy.

Length about 7 inches; wing 2.05 to 2.20; tail 2.75; tarsus 0.75; bill at front 0.42, from gape 0.62 inch. (These measurements are taken from two carbolised specimens.)

This is undoubtedly the bird which Blyth first noticed as distinct from *D. sylvaticus*, naming it subsequently *D. Jerdoni*, but uniting it afterwards with *D. longicaudatus*. Jerdon (*Birds, India, II, p. 180*) doubts the correctness of this identification, and very properly so, I think. I have carefully compared the type specimen, presented by Jerdon, and I have no doubt that it is a distinct and good species. The type measures: wing 2.1, tail 2.6, tarsus 0.72 inch., (bill imperfect). This type specimen exactly agrees in plumage with those from Kachh, and there is another specimen received since by the Indian Museum from Nagpúr, very likely presented by W. T. Blanford. It is also exactly of the same size, as the type.

I found the species not unfrequently between low bushes, but secured only two specimens, which I prepared with carbolic acid. Mr. Hume kindly informed me that he named the bird *Drymoipus rufescens*, noting the distinctions from allied Indian species.\*

#### 544. DRYMOIPUS LONGICAUDATUS.

In two specimens shot on 26th December, the primaries are edged with very pale rufous. There is no dark subterminal band on the tail, but all except the middle feathers pass into albescence towards the tips, which are conspicuously narrowed in one specimen. Lores, supercilium and round the eye white. The two specimens were procured in moderately high grass at the edge of a tank near the village Wandra, in the S. Western part of Kachh. Wing 2.85 and 2.95; tail 2.4 and 2.8; tarsus 0.75, bill at front 0.42 inch.

#### 551. FRANKLINIA BUCHANANI? (an *Cleghornia* Jerdon).

Out of three specimens shot in November and December, in one the upper coloration is rufescent brown and the head above almost quite rufous

\* Since my account was written, Mr. Hume's description of the bird appeared in 'Ibis,' vol. ii, No. 6, for 1872, p. 110. A full account of the bird will be found in that place. Mr. Hume gives the wing of a male as 2.62 inches, and the tail 3.38, tarsus 0.95, and bill at front 0.5 inch. Other specimens are smaller, particularly the young, and the females, he says, are always much smaller than the males. (Sept. 1872.)

with paler shafts to the feathers; a second specimen is paler, being slightly olivaceous brown. Wings dull brown, primaries edged with olivaceous white, secondaries with pale rufescent; edge of wing white; middle tail feathers very conspicuously cross barred, the others dark or blackish brown with white tips, the outer edge of the outermost feather is wholly white. Lores, round the eye and the lower plumage white; ear-coverts whitish, tinged with pale ashy towards their tips; sides of neck and breast tinged with bluish ashy; sides of belly, the abdomen and lower wing coverts, with fulvescent, and the tibial feathers are slightly rufescent. Bill brown, basal half of lower mandible whitish; legs fleshy, darker on the toes. Wing 2·05 to 2·1; tail 2·5 to 2·6; tarsus 0·7; bill at front 0·42 inch.

In the third specimen the upper plumage is still paler than in the other two, ashy brownish, and the rufescent on the head very slight; in other respects it is exactly the same. Wing 1·95; tail 2·45 inch, bill and tarsus the same, as in the two previous specimens. The more ashy and little smaller bird is probably the female or young, but I had not determined the sexes.

The birds were very abundant, flying from bush to bush, almost invariably in company with *Chatorhea caudata*, and feeding mostly on the ground between the bushes.

Should this bird be Jerdon's *F. Cleghornia*? (Comp. Ibis, 1867, p. 24). It is a trifle smaller than Jerdon's measurements of *Buchanani*, but I can see no very perceptible distinctions between specimens of that bird in the Museum and those from Kachh. Gray gives *F. Cleghornia*, in Handlist, Pt. I, p. 196, as a distinct species, and Blyth says that it differs from *Buchanani* by 'having the upper parts pale rufescent brown.' I dare say a good series of the birds from the N. West Provinces will easily settle this question, but several specimens of *Buchanani*, which I saw from the North-West, are paler than the Kachh birds.

553. PHYLLOPNEUSTE RAMA, (apud Jerdon). Not common.

In all birds which I observed, and which are referable to this species, [as distinguished from the smaller *Calomodyta* (? *Iduna*) *agricolensis*, Hume], the first primary was about 0·7 inch. long, but in some birds the third is equal to the fourth, in others the fourth is a trifle longer than the third primary, there is, however, no possibility of distinguishing the birds either by plumage or size. The roundness of the ridge of the bill towards its tip also slightly varies. Wing 2·4; tail 2 to 2·15; tarsus 0·75 to 0·77; bill at front 0·4.

This species is referred to by Gray (Handlist, I, p. 209) as a synonym of *Calamodyta* (*Iduna*) *calligata*, Licht., a Siberian and Eastern European species. The identification is very probably correct.

554. PHYLLOSCOPUS TRISTIS. Not common.

Wing 2·4; tail nearly 1·9, tarsus 0·75; bill at front 0·33, from nostril



0.25; from gape 0.48. Although this specimen slightly differs in size from others, as usually recorded, and although its upper plumage has a decided greenish tinge, it agrees in every other respect with the Indian *tristis*, and not with the European *rufus*; but the difference can scarcely be made out without well preserved examples of the latter species, such as I had occasion to see in Mr. Brooks' collection. Slightly faded specimens of *rufus* are scarcely distinguishable from *tristis*, but I doubt that many specimens of the latter occur without a trace of green tinge in the upper plumage, as represented in Gould's figure in 'Birds of Asia.'

581. SYLVIA (ADOPHANEUS) ORPHEA. Rather rare.

The measurements of two ♂ specimens perfectly accord with those given by Jerdon. Top of head black in both. The outer tail feathers are nearly all white on the outer webs, and also on about the terminal (not basal) half of the inner web.

Gray (Hand-list, I, 214) retains for the Indian species Blyth's name *S. Jerdoni*, as distinct from true *orphea* of Europe, Africa and Palestine. But what are the definable distinctions between these two?

583. SYLVIA (STERPAROLA) CURRUCA. Very common.

Average measurements of four specimens: wing 2.5 to 2.65; tail 2.25; tarsus 0.75 to 0.8; middle toe with claw 0.6 to 0.7; bill 0.36 inch. Comparing these measurements with those of Jerdon, the bill and tarsus are exactly as in *curruca*, but the wing and tail are very nearly as large as in the South Indian *S. affinis*,\* and as Blyth says (Ibis, 1867, p. 28) that the latter only differs from the former by a somewhat larger size, and not in plumage, it is, I think, after all not improbable that they represent only one species with slight variations in the size. The amount of white and its purity on the outer tail feathers varies: the latter are nearly all white, or with the basal half of the inner web dusky, and again in others the inner web is nearly to the tip dusky, but the shaft is always black. The white is pure in some birds, but certainly less so in others. The second last tail feathers are generally tipped white, but not invariably. Tristram gives as a 'constant distinction' between the Indian and the European birds, 'the outer tail feathers are nearly all pure white, and the others tipped with pure white' in the former, but these are most decidedly very variable characters, as far as the purity of the white is concerned. Gray (Hand-list, I, 213) does not allow *curruca* in India, but only *affinis*; and Brooks (J. A. S. B., XLI, Pt. II, 1872, p. 81) seems to have no doubt on that point. Before accepting this decision, I should like to see the differences pointed out which exist between *affinis of all India* and *curruca* of Europe

\* One of the two original types in the old Asiatic Society's collection has the wing 2.7, and the other 2.75, the bill is slightly larger than in any *curruca* I saw from Northorn or Central India.

and Palestine. I can only say that it appears to me far more probable, that all are *curruca*, than that the Northern Indian bird is specifically separable from the European.

589. *MOTACILLA MADERASPATENSIS*, Gm. Not common.

Wing 3·6 to 3·7; tail 3·9; tarsus 1; bill 0·6. These measurements are somewhat smaller than those given by Jerdon, but the coloration agrees perfectly. A male and female, which I shot on 24th October, had the chin and throat still black, with only very few white feathers intermixed.

591. *MOTACILLA DUKIUNENSIS*. Common.

♂ wing 3·6; tail 3·75; tarsus 0·95; bill at front 0·5.

♀ " 3·3, " 3·5; " 0·9; " " 0·5.

These are the measurements of a pair which I shot together on 31st January at Rápúr in the Wagar district. The female is slightly smaller than the male; it has the ashy above and the black on the wings, on the tail and on the gorget, less pure, and the head above and nape are uniform with the upper plumage, *i. e.*, grey. The white on the forehead is of less extent and less pure. Jerdon's description of *Luzoniensis* is so general that it could equally apply to the present species, which has the white band at the side of neck continuous.

593*bis*. *BUDYTES MELANOCEPHALA*.

There were few of these birds seen before the end of December. Of several which I obtained, none has a trace of a white or yellow supercilium. Specimens shot in January had the top of head partially brownish grey, some of the feathers, however, changing to black. Chin whitish in front and the breast with some dark spots. About the middle of February I saw a great number of these birds with the underparts very bright yellow, and the top of the head perfectly black.

Wing 3·2, tail 2·75 to 2·9, tarsus 0·85 to 0·95; bill 0·45 to 0·5 inch.

Mr. Brooks has kindly shewn me his series of Indian and European *B. flava*, *cinerocapilla* and *melanocephala*, and I can only say that the male adult birds of these species are very well marked and easily distinguished, whatever difficulty there may exist in discriminating young and female birds, or those not in full plumage.

(Comp. Notes on *B. flava* and its varieties, in *Ibis*, 1871, p. 138, and Brooks in *J. A. S. B.*, XLI, Pt. II, 1872, p. 82).

594*bis*. *BUDYTES CALCARATUS*, Hodgs. Rare.

A specimen shot on 2nd January near Bhúj agrees in colour with Jerdon's account of *B. citreola*; the back begins to change from grey to black, which latter colour, according to Brooks, distinguishes *calcaratus* from *citreola*; the former also has a slightly larger bill and tarsus. The measurements are: wing 3·25, tail 3, bill at front 0·55, tarsus 0·96, hind claw 0·4 inch.

602. *AGRODROMA CAMPESTRIS*, Common.

616. *PARUS NUCHALIS*.

I shot two specimens during December in the Western part of Kachh, and I saw a few more at various other localities, but the species is decidedly rare. It frequents low jungles, thin and thorny, such as they are in Kachh.

Above, glossy black, somewhat duller on back and tail; nuchal patch, a band about the middle of the wing, extending only to the basal portion of the inner web of the second primary, the extreme tips of all wing feathers, the greater part of the margins of the outer webs of the three or four last primaries, a narrow subterminal outer edge of three or four last secondaries, the broad outer margins, also involving the tips of the tertials, the first outer tail feather entirely, the second nearly so (except on shaft and on the edge of inner web), the outer web of the third last, and the tips of all the succeeding feathers, (decreasing to the centre one), white. A broad black band from the lower mandible along the centre of the underside to the abdomen, broadest in front and on breast. Sides from the angle of the mouth to the lower tail coverts including white, on the side of breast, the belly and abdomen, tinged with very pale but distinctly fulvous green. Tibial feathers white in front, black behind; some of the longest lower tail coverts are blackish at the base of the inner web, the remainder all white. Wing 2·7 to 2·75, tail 2·1 to 2·25; tarsus 0·65; bill at front 0·35. Bill black; legs plumbeous, very stout.

This is probably the most northern part of the country in which the species occurs. The two specimens above described slightly differ in size and coloration from Jerdon's description and figure of a South Indian example, but both evidently are the same species.

663. *CORVUS (ANOMALOCORAX) IMPUDICUS*, Hodgs.

This name is adopted by G. R. Gray (Handl., II, 14) for the Indian crow, *C. splendens*, Tem., being referred to Java and Sumatra. It is the only representant of the *Corvidæ*, but is very common throughout Kachh.

684. *ACRIDOTHERES TRISTIS*. Very common.

In several places I saw this species associating at dusk in great numbers near tanks where there was high grass growing, and at night fall they disappeared under a tremendous noise like shooting stars in the arundinaceous forest, with the peculiar rapid turn in their flight, exactly as *Sturnus vulgaris* does in Europe.

The entire plumage is much duller in winter than in summer, and is exactly like that of *A. fuscus*. The first primary is minute and the fourth the longest. In one specimen, the second primary is entirely white, and some of the first tertials are also white. This is evidently an accidental

variation in the plumage, perhaps the first step to albinism. The wing varies in four specimens from 5·5 to 5·9; tail 3·5 to 3·75; tarsus 1·4 to 1·6; bill at front 0·65 to 0·7 inch.

685. *ACRIDOTHERES GINGINIANUS.*

Not very common, except locally in the eastern parts of Kachh (Wagur district). In young specimens from Bengal the bill is blackish green at base, the wing spot pure white and the under tail coverts and tips of tail feathers dusky white, instead of pale ferruginous.

In addition to the three species, given by Jerdon, G. R. Gray (Handl., II, 20) separates *A. grandis*, Hodgs. = *crisatellus*, Vig., from Nepal, and ? *ater*, V., = *griseus*, Blyth (part), from Pondicherry.

687. *TEMENUCHIUS PAGODARUM.*

Rare. I have seen it only on three or four occasions in pairs. Jerdon's description is rather short. It should state that the lengthened brown feathers pass round the whole neck. The two middle tail feathers are ashy brown, and blackish along the shafts, the remainder dark brown, tipped with white, the latter colour increasing in amount towards the outer feathers; lower tail and under coverts of the wings white, tibial feathers ashy white; there is a small black spot at the base of the lower mandible, and the chin quite in front is also tinged blackish.

690. *PASTOR ROSEUS.*

Very common from about the middle of November. G. R. Gray (Handl. II, 19) quotes the Indian bird as distinct from the European and Western Asiatic under the name *P. ? peganus*, Less. I do not know whether a second species exists in Barma, but surely the Western Indian bird is not different from the European one, which in former years I had very abundantly seen in various parts of Hungary. It is a rare bird in Western Europe.

694. *PLOCEUS BAYA.*

This is the smaller bird,\* described by Jerdon under the above name. Although nests were very numerous seen on branches overhanging river banks &c., the birds themselves were very rare; most of them must have retired to some other more wooded districts, but they are said to return in the rainy season, when they breed.

703. *MUNIA MALABARICA.*

Extremely common. I found the species breeding abundantly during November, December and January in deserted nests of the weaver bird, *P. baya*; and I was told by my shikari that the *Munia* never builds its own nest, always using that of *baya*, as soon as the latter had finished breeding at the end of the rains. However, I have at least on two occasions seen a *Munia* working on an imperfect nest of the *P. baya*, evidently the birds

\* Comp. ante, p. 167.

were repairing it. There certainly were other apparently finished nests with eggs in them, their bases were rather flat, irregular and the entrances were lateral; these looked to me as nests repaired by *Munia*. I found from 6 to 12 eggs in one of them; more than one pair appeared to lay in the same nest, or rather the birds did not seem to be very particular in which nest they lay; they appear to be very communistic in this respect. The eggs are white, varying in shape from elongately oval to almost globular. The former is the prevalent type, averaging in size about 16 by 12 (changing to 11 and 13) m.m.; one of the extreme forms of the globular type measures 19 by 17 m.m.

706. *PASSER INDICUS*. Very common.

I have seen the wing of this species in India vary from 2.75 to 3.25 inch. I wonder, if really good series of the European and the Asiatic sparrows were made, whether it would be possible to define in words the distinction between *indicus* and *domesticus*; I doubt it.

711. *FRINGILLA (GYMNORIS) FLAVICOLLIS*. Common.

The bill of this species certainly more resembles *Fringilla* than *Passer*, and so does the habit, the call, and the general tone of plumage of the bird.

714bis. *FRINGILLARIA\* STRIOLATA*.

Comp. Hume in *Ibis*, 1870, vi, p. 399.

Local and usually seen in pairs, between low bushes on slightly elevated or hilly ground.

♂ wing 3.1; tail 2.35; tarsus 0.63; bill at front 0.36 inch.

♀ " 3; " 2.3; " " ; " " " " " "

This bird was only lately added to the Indian fauna by Mr. Hume. Kachh specimens perfectly agree with Mr. Hume's account.

716. *CITRINELLA† (GLYCYSPIA) HUTTONI*. Very common.

Males have the head lighter ashy than females; and in both sexes the feathers on top of it are slightly darkened along the middle line. The males are also more rufous below, having a broad patch of that colour on the breast. A dark streak from the base of the lower mandible on each side is well marked in both sexes, and the pale mandibular streak has a slight yellowish rufescent tinge. I cannot help doubting the specific distinctness of this bird from *hortulana*, as far as I remember the European bird. The note of both is exactly the same.

756. *MIRAFRA ERYTHROPTERA*. Not common.

I shot once a specimen sitting on a bush about 5 feet high, and pouring forth a rather pleasing song.

\* The species of this genus are almost entirely African, the present species appears to be the most eastern straggler.

† The generic name *Emberiza* has been restricted for the type *E. nivalis*, L., therefore nearly all Indian *Emberizinae* are referable to *Citrinella*.

758. *AMMOMANES PHENICURA.* Common.

Wing 4 to 4·3; tail 2·3 to 2·5; tarsus 0·8 to 0·86 and bill 0·5.\*

760. *PYRRHULAUDA GRISEA.* Common.

Gray (Handl. II, 123) gives *affinis*, Blyth, as a distinct species from 'Madras.'

761. *ALAUDA (CALANDRELLA) BRACHYDACTYLA.* Common.

Wing in three specimens only 3·6 to 3·7 inch, tarsus 0·75 to 0·8.

765. *ALAUDA (SPIZALAUDA) DEVA.* Very common.

The measurements agree with those given by Jerdon, the length of the wing only varying between 3·3 and 3·4 inch. Mr. Hume (Journal A. S. B. xxxix, pt. ii, p. 120) separated a very closely allied and slightly smaller form as *Sp. simillima*. The length of the wing of the Kachh lark is intermediate between his measurements (loc. cit.) of the two forms; and so also appears to be the general tone of the plumage, not being either particularly rufous, nor pale or sandy colour. The lining of the wing is slightly tinged with rufous in a young, but is of a purely fawn or sandy in two adults. The male has the hind toe and claw 0·8, the female 0·7, the former has also the feathers of the crest somewhat longer than the latter.

770. *CERTHILAUDA (ALEMON) DESERTORUM.*

Wing 5·1 to 5·3 inch. Jerdon does not mention the dark mustachial streak which is always well marked. All my specimens have the upper plumage brownish sandy-grey, exactly like those obtained by Mr. Blanford in Abyssinia, while Jerdon noticed an Indian example with dark plumage, probably resembling Gould's figure in Birds of Europe. They are evidently the same birds. (Comp. Blanford, Geol. and Zool. Abyssinia, 1870, p. 385). Gray (Handlist, II, 121) gives Finsch's *Jessei* as distinct from *desertorum*, although their identity has been, I believe, unquestionably proved by Finsch himself (vide Append. II, to that author's Report on birds from Abyssinia, &c., p. 316).

I have obtained this desert lark only on the Rann, between the mainland of Kachh and the islands of Pacham, Kharir, &c., but even in these true desert localities it seems to be rare; for I have not seen more than a dozen examples altogether; generally two of them in society were seen busily hunting after grain on the soft, muddy track, leading through the Rann.

788. *COLUMBA INTERMEDIA.* Very common.

There is scarcely a well in Kachh in which a colony of these pigeons would not breed, and they appear to do this all the year round, as if domesticated.

794. *TURTUR CAMBAYENSIS.* Very common.

796. „ *RISORIUS.* Very common.

\* The numbers referring to these two last measurements are evidently transposed in Jerdon's book, loc. cit. p. 422.

797. *TURTUR HUMILIS*. Common.

799. *PTEROCLES ARENARIUS*.

This is by no means a common bird in Kachh. I only met with it in the south-eastern parts of the province on large grassy plains or fields.

800. *PTEROCLES FASCIATUS*. Very common.

The crepuscular habit of this bird must be explained by its coming to drink at, or little after, dusk. Hundreds of them used to arrive, under a loud chuckling call, to the wells or tanks where I was usually encamped. After they had satisfied their thirst they generally walked away quietly and remained for the night in the neighbouring fields, although they were often constantly alarmed by other animals who came to the wells during the night. When flushed for the first time in the jungles during the day, they generally take only a short flight and drop down again, but when flushed a second time they betake themselves a much greater distance. On the 22nd December, I came across a couple of old birds with 3 young ones, only about one or two days hatched. This must have been exceptional, as the usual breeding season of these birds is much earlier, during the rains.

802. *PTEROCLES EXUSTUS*. Very common.

Comp. Journ. A. S. B. xxxviii, pt. ii, p. 189.

In many females the central rectrices are quite as much elongated as in the males, at least during the winter. A young male shot in November is coloured above like the female, but the chin is whitish, the pectoral band altogether absent, and the sides of the abdomen are nearly as rufous brown, as in the adult male.

803. *PAVO CRISTATUS*. Very common.

The sacred bird of the Thakurs of the country.

818. *FRANCOLINUS VULGARIS*.

♂. Wing 6·3, tail nearly 4, tarsus 1·75 inch.; ♀ a trifle smaller. Out of eight specimens none has the wing under 6 inch. The birds are larger than usual, and though generally distributed, they are not common, and solitary. I shot two or three in the Wagur district, but have not seen nor heard through the whole of Kachh of a different kind of black partridge, as indicated by Capt. McMurdo and Mr. Hume, (comp. Journ. A. S. B. vol. xxxviii, pt. ii, p. 190 and vol. xxxix, pt. ii, p. 121); and I can only conclude that Capt. McMurdo was misled by the size of the bird, so as to regard it as a different species. To what species Mr. Hume's bird belonged, it is really difficult to say.

They generally roost on low trees.

822. *ORTYGORNIS PONTICERIANUS*. Very common.

♂. Wing 5·5 to 5·75, tail 3·3 to 3·6, tarsus 1·4 to 1·5.\*

The wing in two females in 5·25 and 5·5 inch, they have the throat distinctly tinged with ferruginous, while in the males it is almost quite

\* Jerdon says 'not quite 2" !

white. This partridge is extremely common throughout the country, it is quite a homely bird and often enters houses. It invariably roosts on trees, particularly on the Kundu, two or three generally sitting together on a branch between a thick cover of foliage. It generally goes to roost shortly after sunset.

827. *PERDICULA ASIATICA*. Not common.

All the feathers of the upper plumage have in the male one, or generally two, tawny spots along the shafts, bordered with dark.

829. *COTURNIX COMMUNIS*. Local.

832. *TURNIX TAIGOOR*. I have seen and shot this quail only on two occasions, they were solitary males.

836. *EUPODOTIS EDWARDSII*. Not common. (The bustard of Europeans).

837. *HOUBARA MACQUEENII*. Common, and though generally distributed, it is most abundant in the eastern and southern portions of Kachh.

839. *SYPHEOTIDES AURITUS*. The florican is not found during the winter, but is very abundant during the rains.

840*bis*. *CURSORIUS JAMESONI*, Jerdon, ? = *GALLICUS*. Very common.

Wing 6·3 to 6·75, tail 2·4 to 2·7, tarsus 2·1 to 2·3, bill at front 0·8 to 1 inch. In the young the whole of the upper plumage is isabelline, crossed by somewhat undulating dark lines or narrow bands, and the black wing feathers are margined towards the tips with pale; the lower plumage is generally albescient throughout, pale isabelline on breast and with a few brown cross lines. The first change is indicated by the appearance of the white occipital band, then comes the ashy on the occiput, then the lower black band from behind the eye, and at last the cross black band, separating the ashy from the white on the hind occiput. As this gradual change in the occipital bands takes place, the brown lines on the other plumage are gradually disappearing, and young birds shot in January still had them on the wing coverts and on the vent, but somewhat later every trace of the brown lines disappeared, and in the adult the isabelline plumage has a conspicuous rufescent tinge on forehead, hind neck, scapulars and on the upper side of the tail.

I have no specimen of the European bird to compare, but as far as I remember it from having often seen it in former years in Southern Hungary, it strikes me that the flight and the habits of *C. gallicus* are somewhat different. The Indian bird appears to be more solitary, its flight seems to be slightly heavier, and the voice more shrill.

849. *AGALITES EURONICUS*. Common.

Gray (Handl., III, 15) gives *euronicus*, Beseke, as synonym of *fluvialis*, but quotes *Philippinus*, Lath., from India.

852. *CIETTESIA?* *GREGARIA*. Very common in open country, and often seen with *Cursorius*.



Winter plumage: Forehead and superciliary band passing round the occiput white, the former slightly, the latter distinctly tinged with rufous; top of head impure blackish brown; back of neck pale rufescent ashy, many of the feathers being usually tipped pale; general plumage above slightly olivaceous ashy brown, somewhat darker on the rump; primaries black, secondaries white, tertials olivaceous, the last feathers much lengthened; upper tail coverts white; tail white, with a black subterminal band, not extending on the outermost feathers. Lores white, with the shaft of the feathers black and the nude terminations somewhat prolonged; a narrow blackish streak through the eye; ear coverts, and sides of neck slightly rufescent brown, passing on to the breast, on which most of the feathers are subterminally darkened, forming subtrigonal marks. Chin, throat, and the whole lower side from beyond the breast, including lower wing and lower tail coverts, pure white. Wing 8 to 8·3; tail 3·5 to 3·7; tarsus 2·2 to 2·3; bill at front 1·1 to 1·2.

Gray (Handlist, III, 11) adopts the name *Wagleri* for the Indian bird, but I do not know in what our bird differs from the European *gregaria*. A comparison of authentic specimens is needed.

855. *LOBIVANELLUS INDICUS*, (Bood.) Very common.

G. R. Gray, (Hand-list, III, 11.) gives *L. indicus*, Bodd., = *goensis*, Gm., = *atroregularis*, Wagl. Wing 8·5 to 8·9; tail 4·25 to 4·75; tarsus 2·75 to 2·9; bill at front 1·2 to 1·3 inch. It generally keeps near villages about tanks and wells. At the first dawn its characteristic call is heard and repeated all round the habitations.

856. *SARCIOPHORUS BILOBUS*. Very common.

Average measurements of six specimens, shot in December and January. Wing 7·7 to 8, tail 3·1 to 3·3, tarsus 2·3 to 2·5; bill at front 1·1 to 1·2 inch. The black of the top of head is in winter generally mixed with greyish brown, and in younger birds it is almost entirely brown; the chin in the young is whitish, while in adults apparently it is in winter much mixed with black.

Gray (Hand-list, III, 12) gives *Hoplopterus Brissonii*, Wagl. = *bilobus*, Aliq. = *ludoviciana* var  $\beta$ ., Lath., from India; and *H. (Lobipluvia) malabaricus*, Bodd., = *bilobus*, Gm. = *myops*, Less., from Malabar. If the latter reference applies to our bird, it has in that case to stand as *malabaricus*, which would not be a very appropriate name for it:

859. *EDICNEMUS INDICUS*, Salvadori. Common.

Comp. Atti R. Acad. Sc. Nat. 1866, viii, and Ibis, 1866, II, p. 415.

Average measurements of six specimens: Wing 8·5 to 8·8; tail 4·25 to 4·5; tarsus 2·8 to 3·3, bill at front 1·45 to 1·65 inch. The bird is called *Chackua* by the natives.

Gray (Hand-l., III, 9) questions the distinctness of *indicus* from

*crepitans* of Europe; it certainly barely differs; the nude space behind the eye is in the European bird of less extent, than it is in the Indian.

863. *GRUS ANTIGONE*. Tolerably common.

A sacred bird with the Mahomedans, who will not kill a *Saras*. It is almost always seen in pairs.

865. *GRUS CINEREA*. Common.

About the beginning of February the birds collected in very large flocks, and by the middle of that month nearly all of them were gone, only solitary and probably sickly birds remaining.

871. *GALLINAGO SCOLOPACINUS*.

As there are very few swampy grounds, the bird is of course very rare. I have not seen more than about a dozen pairs. One has the wing 5·2, tail 2·2, tarsus 1·3; middle toe with claw 1·5; bill 2·9 inch. The shorter lower wing coverts are white with blackish bars and the longer ones grey with white edges, which in *G. stenura* are replaced by white and dark bars.

875. *LIMOSA ZEOCEPHALA*. Very common.

All the specimens I shot had the white of the face round the bill, extending over a portion of the superciliary band, tinged with golden. It is a very restless and quarrelsome bird, whenever two of them meet each other on the edge of the water. Before the end of October few birds were seen, but they became plentiful about the middle of November. In February none had yet changed their winter garb.

880. *PHILOMACHUS PUGNAX*. Very common.

Male: wing 7·3 to 7·7; tail 2·25 to 2·6; tarsus 1·8 to 2; middle toe with claw 1·6; bill at front 1·3 to 1·4. The general tone of the upper plumage above is ashy brown, the wing coverts are uniform dark brown, more or less tipped with white, but not barred. Bill blackish, more or less variegated with yellowish fleshy at the base.

In the female the general tone, above, is slightly richer, all the pale coloration having a faint rufescent tinge. In other respects both sexes are exactly similarly colored, all the feathers of the upper plumage being darker about the centres. Her bill is black and the feet greenish black. Wing 6·15; tail 2·2; tarsus 1·55, mid toe with claw 1·4; bill at front 1·2 inch.

I have seen them generally feeding in company with pigeons near places where grain was collected after the harvest.

885. *TRINGA TEMMINCKII*. Not common.

891. *ACTITIS GLAREOLA*. Very common.

Specimens, shot in December and January, have the longer upper and lower tail coverts with dark blackish cross bars, the latter besides streaked with the same colour along the shafts. The outermost tail feathers as a rule have some dark spots on the outer webs.

892. *A. OCHROPS.* Very common.

The outermost tail feathers have as a rule a minute subterminal dark spot on the outer web, and the same applies to the longest upper tail-coverts.

893. *A. HYPOLEUCUS.* Very common.

894. *TOTANUS GLOTTIS.* Very common.

Average measurements of four specimens: wing 7·2 to 7·8; tail 3·2 to 3·4, tarsus 2·4 to 2·6; bill at front 2·1 to 2·2 inch. Most of the upper tail coverts have dark cross bars, like the tail. There is a dusky streak from the base of the upper mandible towards the eye, superseded by a pure white band. Outer web of first minute primary and the shaft of the second, the longest one, white.

896. *T. FUSCUS.* Very rare.

The middle tail feathers have in a specimen distinct dark cross bars along the margins of both webs. First long primary with a white shaft, all are towards the margins of the inner webs minutely variegated with white and dusky brown.

897. *T. CALIDRIS.* Rare.

Wing 6·5, tail 2·5, tarsus 2·1, bill at front 1·8 inch. The first long primary has a white shaft, and all are albescens on the margin of the inner web; lower tail coverts more or less streaked or spotted with dusky; breast cinereous, all feathers dark-shafted.

898. *HIMANTOPUS INTERMEDIUS,* Blyth. Very common.

The birds with brownish back and scapulars, blackish hind-head, and with a grey neck, are young. In some specimens the whole neck is white and the occiput black. One adult male, shot in February, had the whole head white, somewhat dusky behind the eye, on the occiput and a little lower below the occiput pure black, then purely white, back and wing glossy greenish black, rump white, tail ashy; below entirely white. It is difficult to imagine what the specific distinction should be between such a bird and, for instance, Gould's figure of *H. autumnalis*, Hasselq. = *melanopterus*, Tem., in 'Birds of Europe.' Gray (Hand-l., III, 47) quotes *H. candidus*, Bonn., as synonym of the European *autumnalis*, reserving Blyth's name *intermedius* for the Indian bird, but I do not think that the question as to the specific distinctness of the two can be considered as settled.

As regards size I found in Kachh specimens the following variations: wing 9 to 9·7; tail 3·2 to 3·3, tarsus 4·25 to 5·3; bill 2·5 to 3 inch.

899. *RECURVIROSTRA AVOCETTA.* Not common.

In what appear to be rather young birds the dark upper coloration is mixed with brown, and the short wing coverts are mostly pale brown. An adult in full plumage, shot at the beginning of January, measures: wing 9·3, tail 3·5, tarsus 3·7, bill in a straight line from front to tip 3·35, this

being equal to the length of lower mandible from chin to tip, measured along the curve.

901. *HYDROPHASIANUS SINENSIS.*

I have seen only a few specimens on the larger lakes. The species breeds in Cashmir.

903. *FULICA ATRA.*

Is generally only seen on the larger lakes. One, rather a large specimen, measures: wing 8·6, tail 2·3, tarsus 2·5, mid toe with claw 3·8, bill to base of disk 1·9, from gape 1·5, height of bill at base 0·7. The bird is evidently an old one, it was one of a pair; the plumage in the middle of the breast is conspicuously mixed with white; the extreme edge of wing is white and the secondaries albeseent.

923. *ARDEA CINEREA.* Not common.

There is a great deal of pure black at the sides of the base of neck and of the anterior breast, extending on either side to the middle of the abdomen, in other respects the plumage agrees with Jerdon's description which is of course that of the winter garb.

926. *HERODIAS INTERMEDIA*, v. Hasselquist, = *EGRETTOIDES* (Tem.).

Very common. Wing 13, tail 4·75, tarsus 5, mid toe with claw 3·75; bill at front 3·5 inch. Comp. G. R. Gray, Handl. III, 28.

927. *H. GARZETTA.*

Rare, and while the former species is usually seen near tanks, the present one prefers streams, and appears to be more solitary. Wing 11·25, tail 4·25, tarsus 4·25, mid toe with claw 3, bill at front 3·65 inch. This specimen was shot on 21st February; it had the occipital crest not fully, but the dorsal train and lengthened pectoral feathers well developed.

928. *DEMIGRETTA SACRA*, Gmel., = *ASHA*, Sykes. Not common.

Comp. G. R. Gray, Handl. III, 28.

In a couple of young birds, with brownish ashy plumage and white on the throat and winglet, the wing is 10·75, tail 3·5, tarsus 3·9, mid toe with claw 2·8, bill at front 3·5 inch.

929. *BUPHUS COROMANDUS.* Very common.

Birds shot on 19th December (*i. e.* in the middle of the winter months) had the upper head tinged golden, and a few golden occipital crest feathers about one inch in length. Wing 9·75, tail 3·5 to 3·8, tarsus 3·5, mid toe with claw 2·75, bill at front 2·3 to 2·4, the same from gape 3·2 inch.

930. *ARDEOLA LEUCOPTERA.* Not common. Wing 9 and tail 3·5 inch.

931. *BUTORIDES JAVANICA.* I have only seen, and shot, a solitary specimen, with the pale triangular spots on all the wing coverts.

937. *NYCTIARDEA NYCTICORAX*, L. = *Nycticorax griseus.*

Is also decidedly rare in Kachh. I have seen only a few specimens in the plumage of the young, which in general tone is very like that of the

previous species, but without the strong metallic lustre. One measures: wing barely 11 inches, bill 2·5, the other measurements exactly agree with those given by Jerdon.

938. *TANTALUS LEUCOCEPHALUS*. Very local, and a shy bird.

An apparently old specimen, but with a broad dark brown band (the feathers in it being, however, tipped white) across the hind breast, shot on 8th February, measures: wing 21·5, tail 7, (the longer lower tail coverts being very much lengthened, soft and decomposed), tarsus 10, mid toe with claw 5·2; bill at front 11 inch.

939. *PLATALEA LEUCORODIA*. Rare.

941. *THRESKIORNIS MELANOCEPHALUS*.

The single specimen seen, and shot in December, has the entire plumage white, merely the lengthened tertials are pale silvery ash towards their terminal halves. Measurements the same as those given by Jerdon.

942. *GERONTICUS PAPILLOSUS*. Very common.

The bill of this species is slenderer, but not longer than that of the last.

944. *PILENICOPTERUS ANTIQUORUM*, Temm.

Comp. Gray in *Ibis*, 1869, v, p. 441.

I saw only two or three flocks of this species at some large tanks in the Wagur district, young and old birds associating.

952. *DENDROCYGNA ARCUATA*. Rare.

957. *SPATULA CLYPEATA*. Very common.

There was scarcely a pool of water to be met with without a few of these birds on it.

961. *CHAULELASMUS STREPERUS*. Very common.

On the 1st November, I met with six half grown ducks on a small lake near the village Dhosa. I shot one, but unfortunately did not preserve it. At the time I had the impression that I shot a young gadwall, and certainly it could only have been either this species, or *Anas boschas* which I saw on the same lake; but I rather think it was the former. I did not know at the moment that the breeding of the gadwall had not been recorded in India.

962. *DAFILA ACUTA*. Common.

964. *QUERQUEDULA CRECCA*. Very common.

968. *ATHYA FERINA*. Rare.

An apparently young female with the upper plumage as in the old, but with the whole of the underparts dull white mixed with pale brown, tinged rufous on chin, neck and breast, and of a somewhat darker hue on the vent, measures: wing 8, tail 2, tarsus 1·45, mid toe with claw 2·6, hind toe with claw 0·75, bill from gape 2 inch.

969. *ATHYA NYROCA*. Rare.

971. *FULIX\** *CRISTATA*. Not common.

975. *PODICEPS MINOR?* = *PHILIPPENSIS*, Bonn. = *minor*, var.  $\beta$ ., Gm. Very common.

Wing 4 to 4·25; tarsus 1·3 to 1·4, mid toe with claw 2, bill at front 0·7 to 0·8, from gape 1·1 to 1·2 inch.

980. *LARUS (CHIROICOEPHALUS) BRUNICEPHALUS*.†

Not common, except along the coast and locally in the Rann. The respective measurements of two specimens are: wing 12·3 and 13·4, tail 4·4 and 4·8; tarsus 2 and 2·22; mid toe with claw 1·65 and 1·8; bill at front 1·3 and 1·5; from gape 2·2 and 2·6 inch. The iris is chocolate brown, bill yellowish, black towards tip; feet yellowish brown. The quills are black; except towards the base, and beginning with the fourth all have a small white tip, gradually increasing in extent on the succeeding feathers. Both specimens, although somewhat small in size, agree perfectly in coloration, which does not appear to differ from the winter plumage of this bird, as usually recorded.

983. *GELICHELIDON NILOTICA*, Hasselq., = *anglica*, Mont.

Local, and not common, except on or along the Rann. Average measurements of three birds, with the loreal region blackish, the occiput and top of head ashy white, and the grey primaries externally tipped darker on *both* webs: wing 11·2 to 11·8; tail 4·5 to 4·8; tarsus 1·3 to 1·35; mid toe with claw 1·15; bill at front 1·35 to 1·5 inch. Iris, feet and bill entirely black.

984. *HYDROCHELIDON INDICA*.

I saw a considerable number of these birds on the tanks in the Rann islands, Paeham and Kharir, but scarcely any on the tanks in Kachh proper. Iris and bill in fresh specimens black‡; feet blackish brown.

1005. *GRACULUS CARBO*. Not uncommon on the larger lakes.

1007. *GRACULUS (MICROCARBO) MELANOGNATHUS*, Brandt.

G. R. Gray (Handl., III, 129) gives *javanicus* of Horsfield as a synonym of the above, but he allows *niger*, Vieillot, as a distinct species from 'S. Asia.'

1008. *PLOTUS MELANOASTER*.

I met with only solitary specimens of both this and the preceding species.

\* *Fulix*, Sundev., 1835 = *Fuligula*, Seps., ex parte; vide G. R. Gray, Handl., III, 86.

† Gould has besides this and *ridibundus* a new species, named *Tibetanus*.

‡ In dried specimens the bill has distinctly a reddish tinge.

*Postscript.*

While the preceding pages were passing through the press, I received from Dr. W. de Tatham at Bhuj a few additional specimens of mammals and tortoises, of which I had not been able to obtain examples at the time of my visit. They are—

*Pteropus medius*, mentioned at p. 223. The specimen sent agrees in all essential points of structure and coloration with those from other parts of India; it has a total length of about 11·5 inches, which is very nearly the length of the middle finger; the ears are 1·2 inch long and only 0·7 inch broad, while in other specimens from India the ears generally have a greater breadth. Most of the Indian specimens also have a considerably longer middle finger.

*Erinaceus pictus*, see p. 223. An adult specimen of this species is 6·5 inches long; in coloration it exactly agrees with the half grown one from which my description was taken, except that the lower belly is less brown, the white extending to nearly within the interfemoral space. In the younger specimen the dentition is normal, agreeing (according to Owen's Comparative Anat. and Phys., III, p. 308) with that of *E. europæus*, the formula being  $i. \frac{3\cdot3}{3\cdot3} + c. \frac{1\cdot1}{0\cdot0} + p. \frac{3\cdot3}{2\cdot2} + m. \frac{3\cdot3}{3\cdot3} = 36$ . The two anterior incisors are very far apart and have the form of canines of *Carnivora*, the third on each side is very much larger than the second, which again is considerably smaller in the upper than in the lower jaw. What is considered as a canine in the upper jaw, is by other Osteologists often accepted as the first premolar. The true first premolar in the upper jaw is smaller than the canine, the second premolar is minute, and in the adult specimen it is altogether absent, it has probably become obsolete; the last premolar is tricuspid in upper and bicuspid in lower jaw; the formula of the adult dentition would, therefore, appear to be  $\frac{3\cdot3}{3\cdot3} + \frac{1\cdot1}{0\cdot0} + \frac{2\cdot2}{2\cdot2} + \frac{3\cdot3}{3\cdot3} = 34$ , but there is a short space visible between the two premolars in the upper jaw, while the first premolar is very close to the canine.

Of tortoises Dr. Tatham sent me a specimen of the *Testudo*, mentioned in my notice\* on the Reptiles of Kachh; it proved to be *T. elegans*, Schoef, as recorded by Günther, or *Peltastes stellatus*, (Schweig.), according to Gray. (Suppl. to Cat. of Shield Rept., 1870, p. 8).

The *Emyda* referred to in the same notice is, Dr. Anderson informs me,

\* Proceedings for May, p. 72. By an error, I stated that the species, which was described to me by a native, is like *T. Grayi*, which specific name should be *Leithii* of Günther.

most probably *vittata* of Peters. He sent a drawing of a middle-aged specimen to Prof. Peters, who says that there is no distinction traceable between the figure of the Kachh specimen and the type of *vittata*. The head, above, is spotted with dark, and the entire carapace is marked with very numerous irregularly radiating dark streaks. The granulation of the carapace becomes apparent after the epidermis has dried up, in fresh specimens no trace of it is to be seen. Young specimens are rather flat, but in old ones the convexity of the carapace is very considerable, and the shell is somewhat depressed along the centre. The species is common both in rivers and tanks, and is often met with crawling from one pool of water to another; I have seen specimens up to a length of 15 inches. One, recently received, has the carapace 10·5 inches long, and 7·7 broad across the abdomen; and the total height is nearly 3·5 inches. The odd osseous antero-central plate of the sternum is broadly rounded, somewhat narrower in front than behind, 1·3 inch long and 1·5 inch broad; the two posterior plates form a suture, 2·3 inch long, they are perfectly united, as in *E. Ceylonensis*, which has a quite similar coloration, and to which *vittata* is united by Gray in Shield Rept., 1870, p. 117.

NOTES ON FISH, COLLECTED BY DR. STOLICZKA IN KACHH,—  
by Surgeon Major F. DAY.

[Received 26th June, read 3rd July, 1872.]

I am indebted to Dr. Stoliczka for the following eighteen species of fish with their local names, collected by him during his recent tour through Kachh. They are interesting as extending our knowledge of the localities to which species spread, and also as first demonstrating the existence of the Genus *Cyprinodon* in the fresh waters of India.

Fam.—GOBIIDÆ.

1. *Gobius giuris*, Ham. Buch. *Kharba Mah. Tulli*, Kachh.

Five specimens up to 6 inches in length.

The inferior pharyngeal bones are each of a triangular shape, the base being external, whilst the two bones are closely approximated together along nearly two-thirds of their internal margins.

Fam.—OPHIOCEPHALIDÆ.

2. *Ophiocephalus punctatus*, Bl. *Dhor*, Kachh; *Dhaka* by foreigners.

Fam.—CYPRINODONTIDÆ.

3. *CYPRINODON STOLICZKANUS*, sp. nov.

B. III, D. 1/8, P. 17, V. 7, A 2/7, C. 15, L. l. 27, L. tr. 8.

Length of head 1/4, of caudal 1/5, height of body 1/4, of dorsal and anal fins 1/3, (in the males), about 1/8 in the females, of the total length. *Eyes* :